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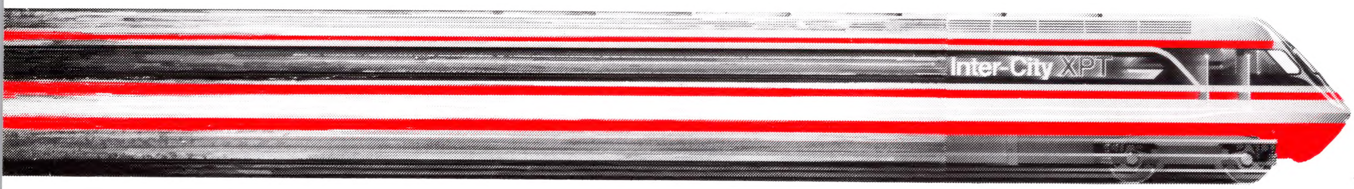

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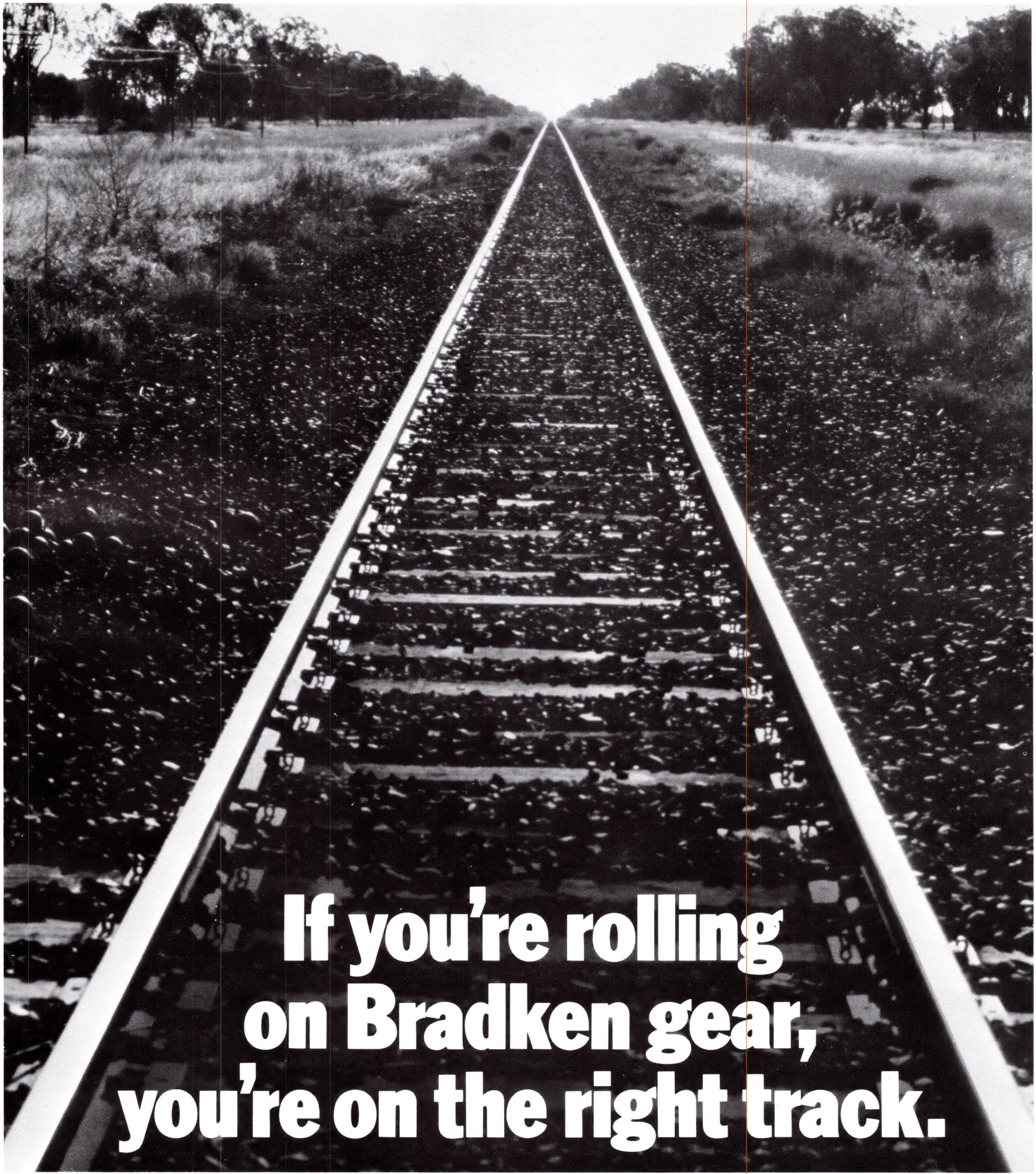

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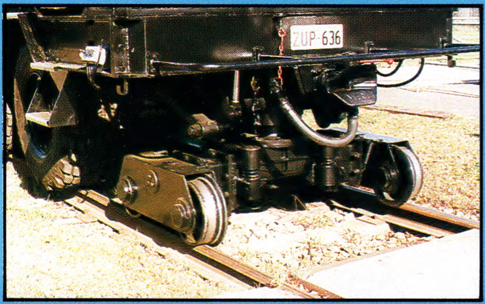

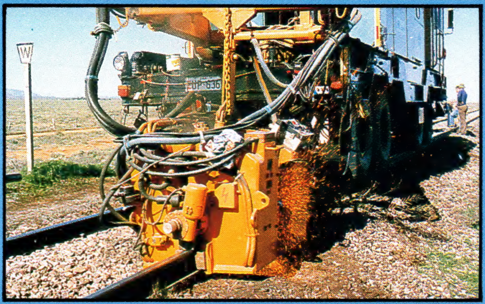

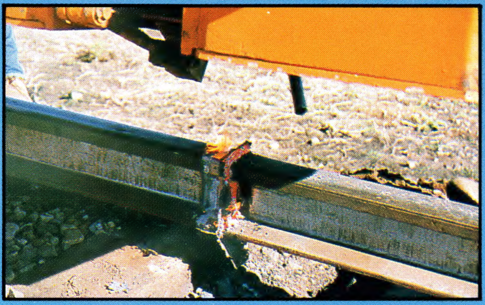

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THE RAILWAYS OF AUSTRALIA QUARTERLY

Volume 26, Number 2
April, May, June 1989

Blur of speed: Interstate freighter at Bonnie Vale between Kalgoorlie and Perth.

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Cover: The Indian-Pacific near the beginning of its journey at Wallerawang in New South Wales.

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THE EXECUTIVE DIRECTOR'S COLUMN

A COMPARATIVE CAUSE FOR PRIDE

M.C.G. SCHRADER

Comparisons are odious, or so says the quotation. But sometimes we can take a little comfort from them, and I recently did just that. The Bureau of Transport and Communications Economics in Canberra has produced an information paper comparing the railway system of eight countries – their policies, trends and performance – and including Australia.

The paper sets out to see how the eight railway systems have responded to a changing competitive environment. It notes their institutional settings, the sizes of the tasks they perform, and some major technological developments.

The paper is descriptive and relies largely on published statistics. And because published statistics very often have different bases, and because different items are included in them, direct comparisons are often invalid. This paper, however, reports on trends, and in constant monetary terms of the countries concerned, so that the time series used is valid.

I commend the paper to you, and ask that you note some of the points made.

In its tables of performance, the paper uses three years: 1981, 1983 and 1985. Taking the bureau's figures over those four years at their face value, I note that Australian rail's freight traffic task grew by 23 per cent, and its freight revenue by 28 per cent. The freight task of USA Class 1 Railroads rose by 3 per cent, and their revenue fell by 22 per cent. In all but one of the other countries examined, the freight task fell. (West Germany recorded a 3 per cent rise in tonne/kilometres, but a 16 per cent drop in revenue.)

Non-urban passenger traffic is not a great task for Australian railways, but even so, our revenue rose by 8 per cent – more than in Britain and West Germany (which recorded a sharp fall). Amtrak (US) turned in a better performance of 10 per cent, and France achieved an excellent 33 per cent growth.

The aim of Australia's rail managements has been greater productivity, and the bureau's figures highlight our success. During the period, the tonne/kilometres performed per railway employee rose by 28 per cent, a much better result than in any other country except for the freight railroads of the US. Their performance was a most commendable 39 per cent increase, and it shows that we have some way to go. Behind the US performance lie factors noted in the bureau's paper that do not apply in Australia. In the US, Class 1 Railroads have divested themselves of non-profitable secondary lines, with a resultant fall in the staff-to-traffic ratio. Typical train sizes in the US are much larger than in Australia, reflecting investment in modern rollingstock, track upgrading and train control systems (the size of US train crews is larger than in Australia).

Important in Australia are the tabled "explicit government contributions to railway operations". In the period, these fell by 23 per cent, a much better performance than in any other country except Japan, which recorded a 32 per cent fall (and there are specific financial reasons for this). In France, with its dramatic increase in passenger revenue, government contributions *rose* by 6 per cent.

When reviewing Australia's performance, cynics might be tempted to say "Yes, but" and recall the old saying that there are lies, damned lies and statistics.

But when a body with the standing of the Bureau of Transport and Communications Economics of its own accord publishes a paper making the points I have highlighted, then Australia's railway managers and workers can feel a little proud.

They cannot feel *complacent*, of course, but proud of what has been achieved so far in the determined battle to give Australia a truly competitive transport system based on the *safest* land transport technology available.

AN REACHES 10-YEAR GOAL OF BREAK-EVEN

AN SHOWS THAT EFFICIENT FREIGHT OPERATIONS NEED NOT BE A BURDEN ON THE TAXPAYER

Ten years ago Australian National set itself a major goal in its first corporate plan: to break even on commercial operations by 1988. It couldn't be done, said many people.

But it has been done. The freight business earned a surplus of $0.7 million during the 1987/88 financial year, a net improvement of $12.4 million over the previous year.

The surplus is not large, but it has been achieved despite the imposition of $22 million in taxation, something unforeseen when the goal was set. Without these unexpected extra charges, break-even would have been achieved two years ago.

According to Dr Don Williams, Australian National Railways Commission Chairman, the achievement of break-even proves that efficienly run railways can provide long distance bulk freight transport without burdening taxpayers.

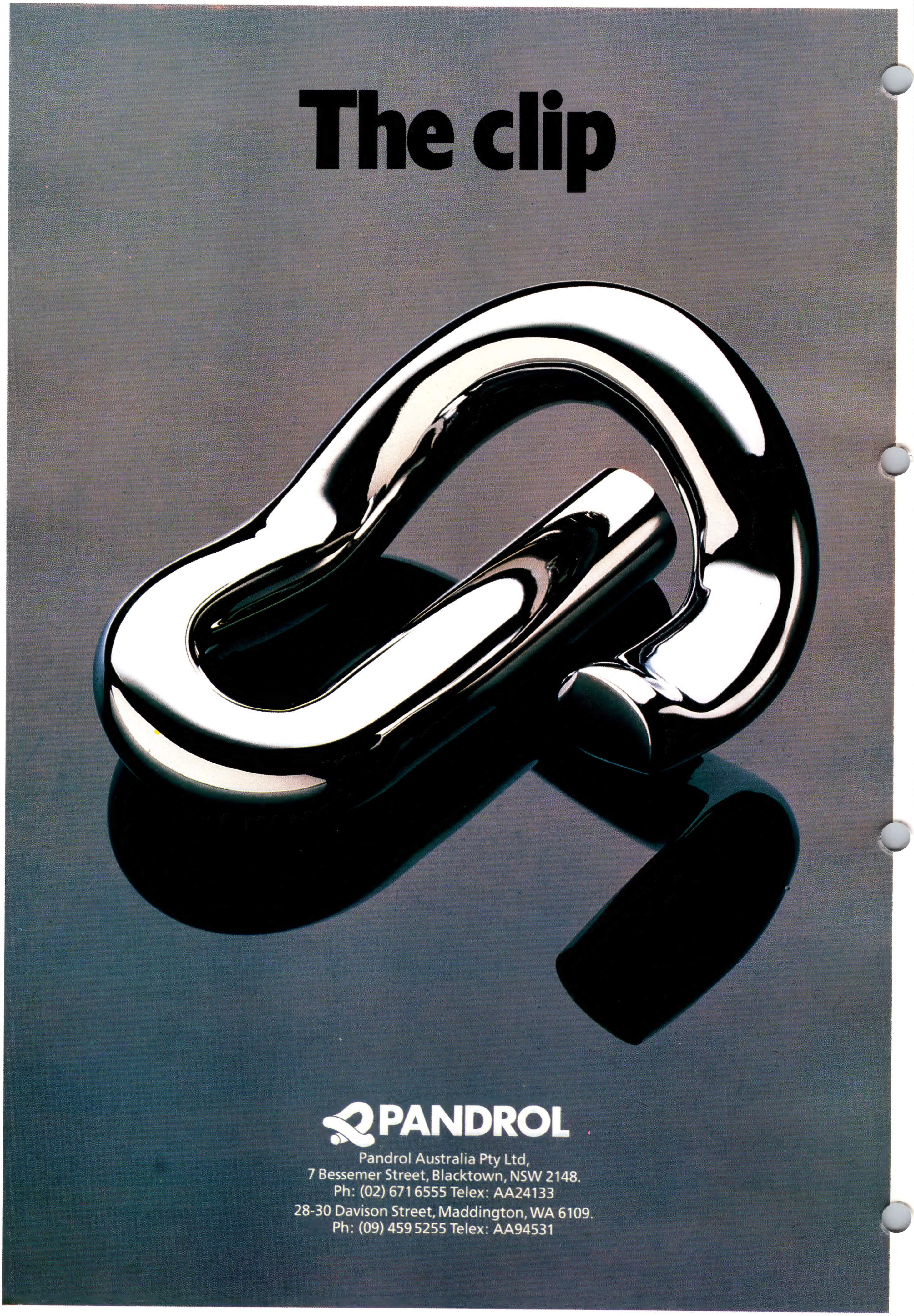
Revenue for AN Freight (freight on the mainland) increased by 9.9 per cent to $236.8 million from 1986/87 to 1987/88. A continued growth in business was partly responsible for this favourable result. The freight task grew to a record 7,647 million net tonne kilometres (NTK).

AN Freight consists of three business groups. The manufactured products group performed well during 1987/88, increasing revenue to $67.5 million (13.4 per cent over the previous year). Revenue from the largest commodity in this group, iron and steel, grew very stongly (42.8 per cent). The forwarders and intermodal freight group recorded sales of $109.8 million (10.3 per cent increase), slightly below budget. Growth of sales from bulk products was also slightly below expectations, rising to $59.5 million (5.6 per cent above 1986/87).

The performance of AN's two community services obligations – AN Passenger Business and AN Tasrail – also improved during 1987/88. (These are services and activities that cannot be run on a commercial basis but which the federal government has requested AN to continue operating.) The total revenue supplements required from the federal government to support their operations fell by $16.7 million over with the previous year. The CSOs exceeded their government-set cost recovery target by $13.7 million, recording an overall deficit of $51.9 million.

AN Passenger Business lost $32.2 million, or $5.2 million taking into account the federal government's revenue supplement. Total revenue from the business increased by 5 per cent below budget expectations.

AN Tasrail reduced its loss by 20.8 per cent – to $12.3 million. Freight revenue was up 17.6 per cent, while expenditure rose by only 1.4 per cent. The freight task increased by 6.2 per cent, with strong rises in several commodity groups.



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AN Tasrail's results are much better than required by the levels of revenue supplement. The government will support AN Tasrail for another five years, with diminishing levels of funding. By 1988/89, it is estimated that only 29 per cent of AN Tasrail's total revenue will come from government, compared with 54 per cent in 1984/85 and 64 per cent in 1977/78.

AN's improved commercial freight performance has been achieved by restraining costs and careful investment in new facilities. Total expenditure (excluding capital investment expenditure) increased by only $6.4 million (1.8 per cent) compared with 1986/87 despite the large increase in traffic and the requirement (from 1 July 1987) that AN pay customs duty, which added $2.3 million to the cost of imported materials.

Labour and related expenses were reduced by $1.4 million, reflecting continuing reductions in AN's staff. The number of employees fell by 640 during the years and there will be further reductions so that AN can bring its costs down to the level of its competitors.

To meet customers' requirements and to ensure a competitive edge over other transport operators, AN has had to upgrade equipment and apply new technologies to increase productivity and service. Total capital expenditure during 1987/88 was $85.3 million. AN will continue to ensure that projects show rates of return much greater than borrowing costs and that increasing capital charges are well covered by the future earning capacity of the business.

AN has continued to increase employee productivity – a further 18 per cent in 1987/88. Wagon and locomotive productivity also increased – by 22 per cent and 14 per cent.

Since 1978, employee productivity has risen by 150 per cent. "This is an achievement which few other organisations could match. AN is now the most productive government railway in Australia," Dr Williams said.

"At the same time, the volume of business we have handled has increased by 60 per cent. Our customers have clearly benefited from AN's greater efficiency."

Industrial disputes during 1987/88 were at the lowest level in AN's history and well below the average for all Australian businesses. According to AN's Managing Director, Mr Russell King, this reflects the sense of common purpose and the goodwill evident at all levels among AN employees and the negotiating skills of AN managers and union officials.

"AN's business is very vulnerable to industrial disruption, as competing road transport is readily available. Therefore it is gratifying to see this development," Mr King said.

"However, stoppages occurring in other rail systems often impact directly upon AN, and these remain a major concern. There were five such stoppages during the year, from which AN suffered a direct loss of $8.3 million. Long-term losses cannot be calculated."

AN freight cars dwarfed by silos. The system's freight revenue increased by 9.9 per cent to $236.8 million in 1987/88 as its business continued to grow.

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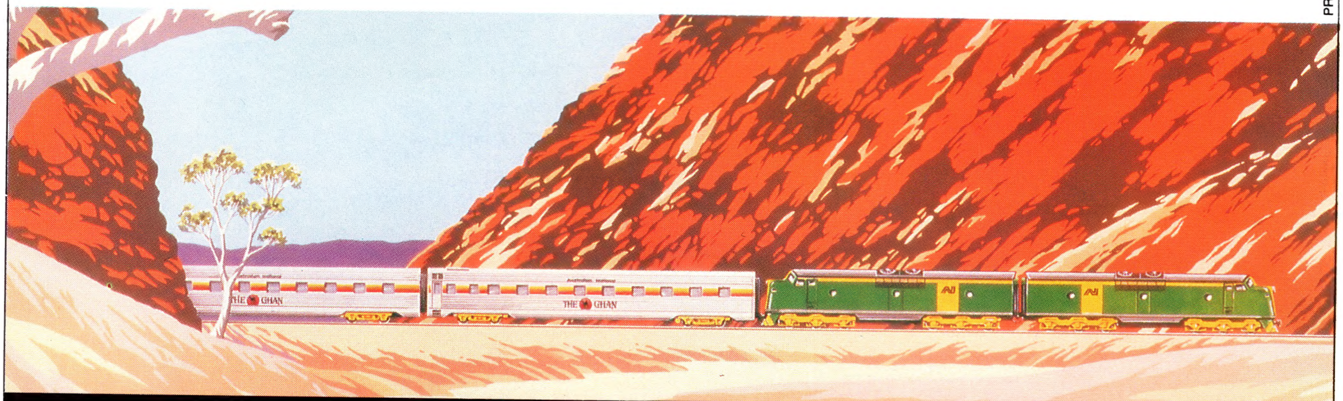

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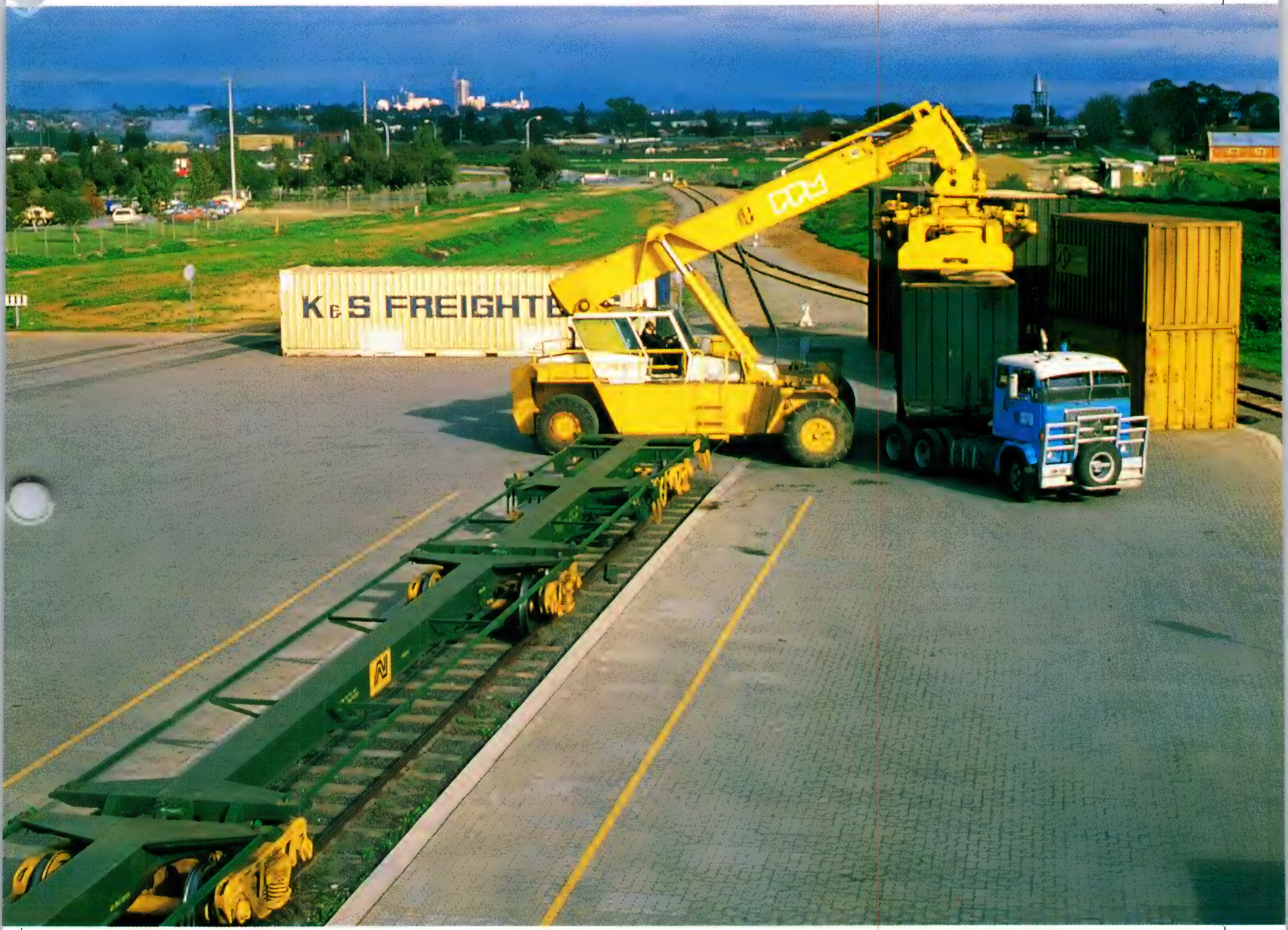


Loading freight: AN's five-pack container wagons have been highly successful. Shared bogies reduce the tare weight.

The cost of employee-related provisions continues to be a major concern for AN: $144.4 million in provisions already on AN's balance sheet has not been funded in past years as a result of government policy to exclude these from revenue supplements. The rising cost of superannuation is of equal concern; AN is paying far more in superannuation that its competitors or any other government business enterprise.

Two factors outside AN's control will have a significant effect on its performance in coming years – cost recovery by the road transport industry and management of interstate services.

"There is no doubt that the present over-supplied road transport industry is unrealistically depressing the level of freight rates for all concerned, and is partly the cause of poor cost recovery levels by rail systems," Dr Williams said.

"Rail's performance will be immensely enhanced by greater unity of management, especially interstate services. AN has taken the lead in this area and has willingly participated in initiatives taken by others."

AN's task in the next decade will be as difficult as that faced during the first decade of operation. Cost recovery targets set by government for CSOs, including passenger services in South Australia, are becoming more exacting, and competition for freight traffic will continue to increase. Rail's strength in the freight market is becoming more widely recognised, but must be sustained by vigorous marketing and technical innovation.

According to Mr King, the competitive market in which AN operates means it must continually reshape the business to match changing customer needs and new technology.

STATE RAIL'S

NEW AGENDA

STATE RAIL'S NEW STRUCTURE WILL BRING THE SYSTEM'S MANAGEMENT CLOSER TO ITS CUSTOMERS

State Rail's new Cityrail suburban and intercity division has the advantage of the stylish and efficient Tangara.

The two business-based autonomous groups into which State Rail has been split, Commuter Services (Cityrail) and Freight and Country Passenger, are being fine-tuned in the greatest rearrangement of the NSW rail system since it began 134 years ago.

The changes, outlined in the last issue of Network, will reduce the size of middle management, increase the decentralisation and speed of decision-making, and improve communications.

Increased accountability will lead to better service, giving rail customers, particularly in country regions, better access to and a greater say in rail management.

The new Cityrail (Sydney suburban and intercity passenger) group was announced by group general manager Rob Schwarzer early in February.

For the first time in NSW, managers will be appointed to take responsibility for the operation and commercial performance of seven individual commuter lines.

They will be accountable for train and service operations, day-to-day safety, customer relations, staff, business planning, and efficient performance.

General managers in the operating and engineering areas will provide support and be responsible for the integrity, safety, and co-ordination of the systems.

Because of the smaller organisational structure, line general managers will be more visible and closer to their staff.

Photographs of the managers, along with their telephone numbers, will be displayed at every railway station on their line.

The high public profile of the line managers is designed to encourage comment from passengers.

Speaking at a media conference after the first meeting of the new State Rail Authority Board, chief executive and chairman Ross Sayers said easy public access to the line managers would do away with "faceless bureaucracy".

Support services will be geared to the new emphasis on local issues, and maintenance will be regionalised to provide support to keep every line at maximum performance level.

The new structure was decided upon after a recent study of overseas commuter systems by Mr Schwarzer. It also reflects advice from international transport consultants Booz Allen and Hamilton, now completing a study of State Rail.

Staff and unions will be extensively consulted before the new structure is implemented. Their skills and experience will continue to be of paramount importance.

The line managers will deal directly with community and customer needs, improve service, and provide a direct link between the public and State Rail's executive.

This will allow other support staff to concentrate on the basics of railway operations: maintaining and improving service.

In mid-January, Mr Sayers announced that the state had been split into three regions in a new structure for the Freight and Country Passenger Group, managed by Vince Graham. The changes give country regions a greater say in rail management.

Under the plan, each region (north, south and west) will have a general manager responsible for all operations, maintenance, and personnel.

Ross Sayers: Young and enthusiastic new managers will give State Rail services a new impetus

A metropolitan regional manager will control all freight operations in the Sydney area.

"Having senior executives in each region will give our country customers greater access to decision-makers, as well as bringing State Rail closer to the needs of the rural community," Mr Sayers said.

"The regional managers will report directly to Mr Graham."

The new structure will also enable State Rail's major business sectors to be separately and commercially managed in accordance with new NSW Government legislation.

A prominent part of that legislation is that State Rail is no longer a "common carrier" and must run its operations commercially.

General managers will be responsible for each of the country passenger, grain, coal, parcels, and general freight businesses.

In this way each market segment can be managed separately on a commercial basis.

Mr Sayers described the new managers as a group of highly qualified specialists.

"Their youth (most in the late 30s and early 40s) and enthusiasm will bring a new impetus to the competitive field of freight transport and important services to country passengers," Mr Sayers said.

The acting general manager Country Passenger, Faye Powell, becomes the most senior woman in NSW railway history. She brings to the position a wealth of railway experience and qualifications. She has held senior positions as project manager Capital Works, strategic development manager, and executive assistant Passenger Services.

Faye Powell is a Bachelor of Economics and has a diploma in marketing management.

State Rail's intercity service from Wollongong. The new Cityrail grouping means managers will take direct responsibility for individual commuter lines.

V
20

ELECTRIC SERVICE SLASHES GYMPIE TIMES

The 67km extension of electrification from Nambour to Gympie on the North Coast line, commissioned by Queensland Transport Minister Peter McKechnie on 4 February 1989, cuts travelling time for the 173km journey between Brisbane and Gympie by 20 minutes.

The weekday arrival time of 8.45am at Brisbane Central and departure at 5.30pm caters for residents of the Gympie district working or shopping in Brisbane. There are also weekend services.

Passengers travel in new electric cars built by Walkers-Asea at Maryborough, north of Brisbane, that have reversible full-length reclining seats, full carpeting, air-conditioning, individual reading lamps, and overhead luggage racks.

The Gympie-Brisbane electric service departs from the new Gympie North station, which is also used by passengers travelling on the Sunlander, Capricornian and Queenslander trains.

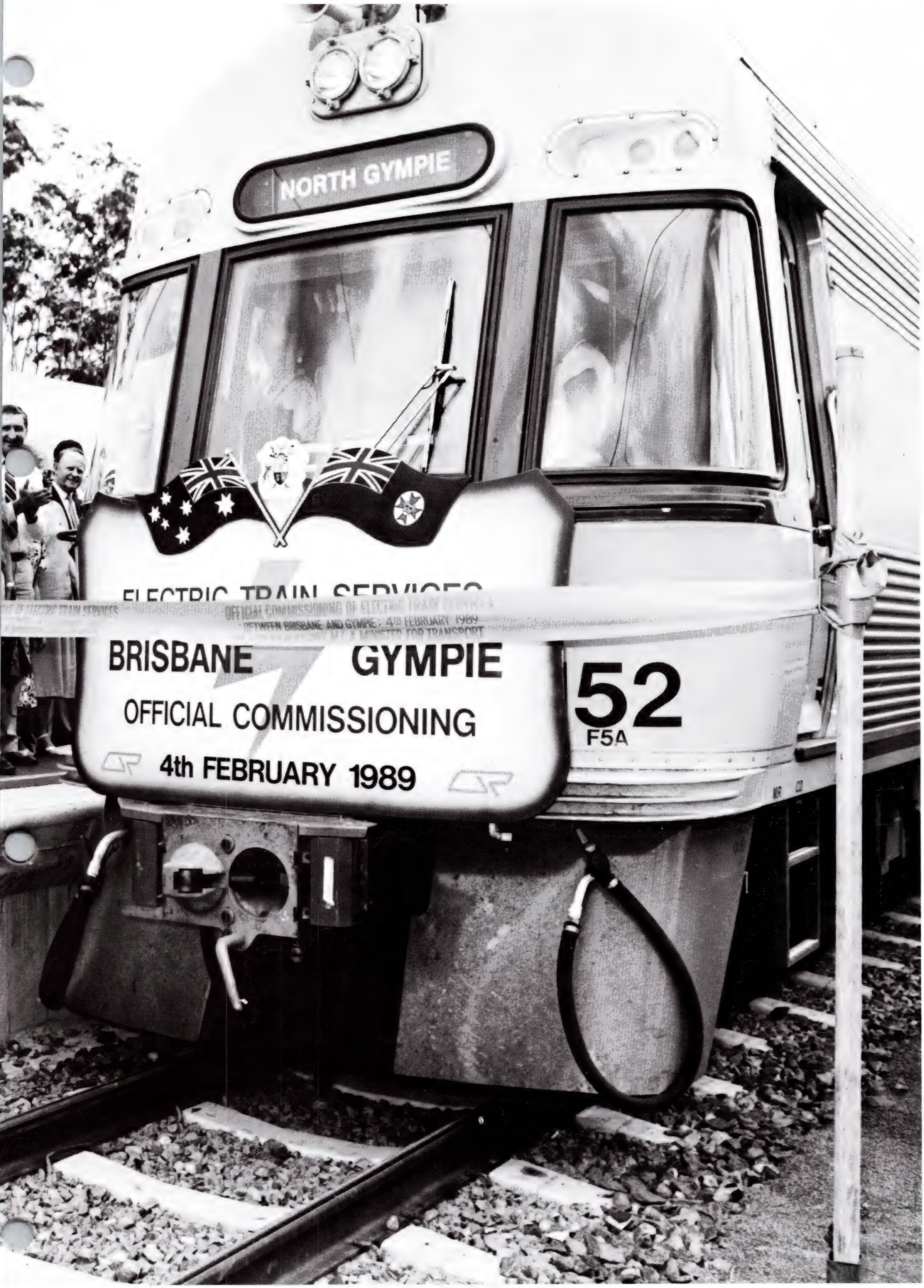
The new station is on the most northerly of the two crossing loops on the 9.5km Gympie deviation, one of four major realignments built as part of a $90 million upgrading of the North Coast railway between Caboolture and Rockhampton before the introduction of electrified trains.

The introduction of much faster passenger services between Brisbane and Rockhampton from 3 July 1989 will mark the completion of the $1050 million main line electrification scheme.

The new electric trains will cut travelling times between Brisbane and Rockhampton to 9½ hours, a saving of three hours. Sunlander and Queenslander trains will also run to faster times between Brisbane and Cairns.

The 2100km single track electrified main line network will link major export coalfields in Central Queensland with their ports and Brisbane.

Main picture: The commissioning train breaks the ribbon at Gympie station to mark the introduction of electric trains between Brisbane and Gympie.
Above: Queensland Commission for Railways Ralph Sheehy (left) and Queensland Transport Minister Peter McKechnie at the commissioning.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Queensland Railways electric coal train at Jilalan, near Mackay, in Central Queensland: More coal means more rollingstock and new capital works.

CAIRNS STATION'S $400M

The 13-hectare site now occupied by the Cairns Railway Station, marshalling yards and workshops will be transformed into a new $400 million railway station, transit centre, hotel, and commercial, retail, residential and entertainment space.

The huge Cairns Central project, which will take five years, is part of Queensland Railways' rationalisation of its large property holdings. The aim is to develop these holdings in ways which benefit the whole community.

At places where Queensland Railways has continuing use of the land, leasehold conditions apply. Most projects are a combination of freehold and leasehold. Prime considerations are the safe operations of the railway and the upgrading of railway facilities for the public and staff.

Cairns Central follows the successful redevelopment of railway airspace at Central Station, the Brisbane Transit Centre, Toowong Village and Ipswich, all in the Brisbane metropolitan area.

The project will see the old railway marshalling yards and workshops transferred from the heart of Cairns to modern quarters in the Portsmith industrial estate. This will enhance the central city area of the booming

QR EXPECTS A RECORD COAL HAUL

Queensland Railways expects to haul 67 million tonnes of coal in the financial year 1988/89, a record for one commodity on an Australian railway system and a big increase on the record of 62 million tonnes railed by Queensland Railways in 1987/88.

The increase is due to the expansion of mines at Blair Athol and the Cook Colliery at South Blackwater in Central Queensland and operational efficiencies stemming from main line electrification. Pacific Coal will expand annual production at Blair Athol from 5 million to 8 million tonnes. Extra rollingstock will include seven electric locomotives, one locotrol unit and one hundred and fifty 90-tonne wagons.

Capital works include extra passing loops to improve traffic capacity and the upgrading of workshops at Jilalan, near Mackay, for better handling of wagon repairs. These will be ready by July 1990.

In addition, Coal Resources of Queensland, the operator of Cook Colliery near Blackwater, is increasing its output to 1.8 million tonnes a year. To accommodate the extra coal tonnage, QR will duplicate 17km of electrified track between Gladstone and Rockhampton, including earthworks, bridges, trackwork, signalling and overhead traction wiring, by the end of 1989. It will also provide additional rollingstock.

Main line electrification has streamlined operations, including improving turnarounds and fuel economy. Turnarounds on the Blackwater system, between the mines and the Port of Gladstone and return, have shortened from 36 to 28 hours.

This reduction has been achieved through less maintenance for electric locomotives compared with diesel, the better operation of the electric locomotives, including faster acceleration, and track upgrading for electrification and earlier mining projects.

With the improved turnarounds has come more efficient use of manpower: three shifts instead of five are required for crewing Blackwater trains to the Port of Gladstone and back. A reduction of more than 10 per cent in the locomotive fleet (for comparable tonnages) has also been achieved. Consists of five electric locomotives have replaced six-diesel operation on the 2km-long 148-wagon trains, and four electric locomotives have taken over from five diesels on 102-wagon trains.

As well as improving turnarounds, electrification is cutting fuel costs. Annual savings of up to $12 million for coal traffic are expected once the system is fully electrified.

The 1490km electrified coal network in Central Queensland is one of the world's great heavy haul rail operations. In 1968, state-wide railings of domestic and export coal were little more than 100,000 tonnes a week. This has risen to a forecast weekly average of 1.2 million tonnes for this financial year through the export Ports of Hay Point and Dalrymple Bay, south of Mackay, Abbot Point, near Bowen, and Fisherman Islands in Brisbane.

REVAMP

tourist capital of North Queensland and reduce traffic delays caused by marshalling trains across two major roads.

The transfer of the railway yards and workshops to the Portsmith industrial estate, including the building of a new 3km rail connection, has begun and is expected to be finished by January 1990. The $15 million cost will be met from the land sale.

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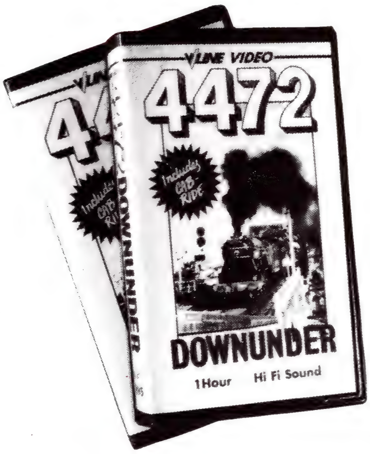

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WESTRAIL INITIATIVES

EXCITING PROSPECTS FOR MIDLANDS

Two major initiatives with international sales potential by Westrail will benefit its Midland Workshops.

In January, an agreement was signed between two international companies to develop a new generation of railway locomotives in Western Australia. Senior representatives from General Electric, Asea Brown Boveri, A. Goninan and Company, and the Prime Minister, Bob Hawke, and Premier Peter Dowding of Western Australia visited the Midlands Workshops to sign a memorandum of understanding to develop an advanced fourth generation locomotive.

The agreement flowed from a Westrail tender early last year for 15 diesel electric locomotives for the railway's country system. The Australian company A. Goninan won the tender to build the locomotives using equipment supplied from its United States licensor, General Electric.

A proposal for fourth generation equipment offered by Asea Brown Boveri, the European electrical and engineering group, sparked interest and the two organisations were brought together to develop the new locomotive technology. (A fourth generation locomotive is a diesel electric locomotive that uses AC motors to drive the wheels, providing much better traction and greater economy and efficiency.)

Safer spectacles: Prime Minister Bob Hawke enjoyed the joke at Midland Workshops when Westrail staff presented him with a special pair of safety glasses designed to prevent a repetition of his famous 1986 cricketing accident.

Preliminary engineering evaluation has had positive results. It is planned to reach the prototype stage by next year.

"The technology will be developed in Western Australia, but we would expect to export to markets in Australia, India and throughout South East Asia and East Africa," Mr Dowding said.

Westrail's Midland Workshops could be involved in the manufacturing of components. It has the potential to attract all types of ancillary works.

Under another Westrail initiative, the workshops could also be manufacturing freight bogies for international markets. The workshops and Asea Brown Boveri are working towards developing six pre-production fast freight bogies during the first half of this year.

Asea has already built standard-gauge prototypes, now being tested in Sweden, and narrow-gauge versions are on trial in Queensland.

Testing, development and talks over 15 months between Westrail and ABB led to the agreement to go ahead with the prototypes. The freight bogie would be developed with enhanced ride and wear characteristics at a price that should give it a share of the market. Ideally, it would weigh no more than a standard three-piece design.

The 22.5 tonne axle load bogies would have one other advantage — speed. Designed to travel at up to 140km/h, the bogies could, theoretically, take one day off the journey time between WA and the eastern states.

AN'S NEW DIVISION

PASSENGER AND TRAVEL PLAN AHEAD

The separation of Australian National's business into a self-contained division of AN will allow the system to adopt a higher profile in the tourism industry, according to the manager of passenger business, John Smith.

"AN passenger and travel will become a competitive and efficient member of the tourism industry by having a greater say in the forward planning process and controlling all our own resources," he said.

Becoming a separate division of AN will not mean isolation from the main body of the organisation. Instead it will allow passenger business and travel to become more commercial and cost-effective in line with AN's corporate policy of being a commercially viable organisation.

Serving customers' needs from coach class through to the specialised travel of the conference car and Prince of Wales car will now be handled more efficiently by one body.

The creation of a customer service section will be an important change resulting from AN passenger business becoming a separate division. Under customer service manager Harry Waterworth, this section will have complete control over passenger terminals and staff involved with the travelling public. It concerns include customer comfort, upkeep of facilities, appearance of terminals and gardens, complaints, train staff, catering, and general customer needs.

According to Geoff Ind, passenger financial manager, the separation will also mean that the new division will have a more direct role in the accounting process. Finance branch staff previously handling revenue accounting on behalf of passenger business have been transferred to the new division, and new positions to handle passenger business expenditure accounting have been created.

John Smith, manager passenger business for Australian National: AN passenger and travel will become more competitive and efficient by having a greater say in planning and by controlling its own resources.

Functions traditionally handled by personnel staff such as manpower planning transfers, issuing of passes, discipline and redeployment of staff will now be undertaken within the new division, as will property matters concerning revenue-earning assets under the control of passenger business.

The provision and maintenance of passenger rollingstock, special service cars, train preparation, shunting, stabling and yard operations will also transfer to the new division under the control of passenger operations manager Barry White, as will the passenger rollingstock depot at Mile End.

Locomotives will still be on roster from the main fleet, and the passenger business division will pay AN for locomotive use, track maintenance and other resources.

John Morley, passenger marketing and travel manager, said the obvious benefit of becoming a separate business entity was the ability to react quickly to what was happening in the marketplace, particularly over pricing and tourism developments.

New rail package tours to be offered to travel agents are now being developed by travel development manager Jim Morman. The travel centre has already proved successful and, with the expansion into package tours, AN passenger and travel will become more competitive in the tourism market.

The passenger business division is housed in a building north of AN House at Keswick previously used by the occupational health and safety section.

FUTURE FOR GAS?

The South Australian Office of Energy Planning is studying the feasibility of using compressed natural gas (CNG) as a fuel for diesel electric locomotives.

The $50,000 project is being funded by the Commonwealth Government through the National Energy Research, Development and Demonstration Programme (NERDD).

While it could be a long time before we see a gas-powered locomotive hustling a freight across the Nullarbor and up the Mount Lofty Ranges, the decision to fund this study reflects the liquid fuel problems facing Australia. Liquid fuel self-sufficiency is forecast to decline from nearly 100 per cent today to about 35 per cent by 2000, with an annual oil import bill of about $6 billion by that time.

Should distillate become uneconomic or unavailable, most Australian railways would be forced to use other fuels to power their locomotives, either directly or indirectly via electricity generation.

In recognition of the problem, the Commonwealth and states agreed in 1987 to explore alternative fuels, including liquified petroleum gas (LPG) and CNG, both abundant in Australia.

The CNG locomotive fuel project is one of 17 NEROD studies on alternative fuels for Australian transport. The grant for these studies is $4.2 million, which reflects the concern of the Australian government to develop alternative fuels, particularly for diesel fuel, the use of which is projected to grow faster than petrol.

The SA study, being conducted with Australian National and the SA Gas Company, is examining the substitution of natural gas for distillate in diesel-electric locomotives by converting the engines to allow dual fuel operation.

Natural gas is cheap compared to diesel oil and the savings could more than compensate for the cost of converting engines to use the new fuel.

That may sound simple, but there are many constraints – and more are likely to emerge as the project proceeds. The main task is to convert diesel engines to run on both distillate and CNG without markedly reducing engine power or life, while remaining simple to operate and fuel-efficient.

Modern diesel locomotives have little spare space to fit CNG tanks, so CNG cylinders would probably be hauled in a tender.

“This weight will be significant and, if the distance between refuelling is too great, the cost of transporting the cylinders could offset the savings in fuel costs,” said a project officer.

Among the economic considerations are the cost of the fuel tenders, depot facilities, control devices, and of compressor stations to compress natural gas to high (16.5 MPa) pressures.

Safety considerations are paramount. Locomotive drivers and the public have to be assured of the safety of locomotives incorporating or hauling high pressure gas cylinders. (LPG is of course regularly hauled by rail with an excellent safety record.)

The need to keep refuelling times to around 15 minutes will almost certainly mean the use of change-over gas cylinder tenders with their associated costs. And hauling gas tenders not only reduces the train payload by weight but also reduces the length of a train using existing crossing loops and sidings.

Any of these considerations could make the whole project unviable. Initially, the study is examining the costs of transporting the gas cylinders and operating ranges between refuelling for dual fuel locomotives.

“We are gathering information from public and private railway operators in Australia on the types of engines used, fuel consumption rates and annual fuel usage,” the spokesman said.

Mathematical analyses of the influence of various factors on the operating range of locomotives will help determine the optimum operating range of CNG powered trains. It will be necessary to consider each route individually, taking account of distance, gradients and train loading.

The outcome may favour some routes and rule out others. It may be necessary to dedicate converted locomotives to the chosen routes.

Much work remains before even a demonstration CNG locomotive is contemplated, but the project's outcome may determine the future viability of railways.

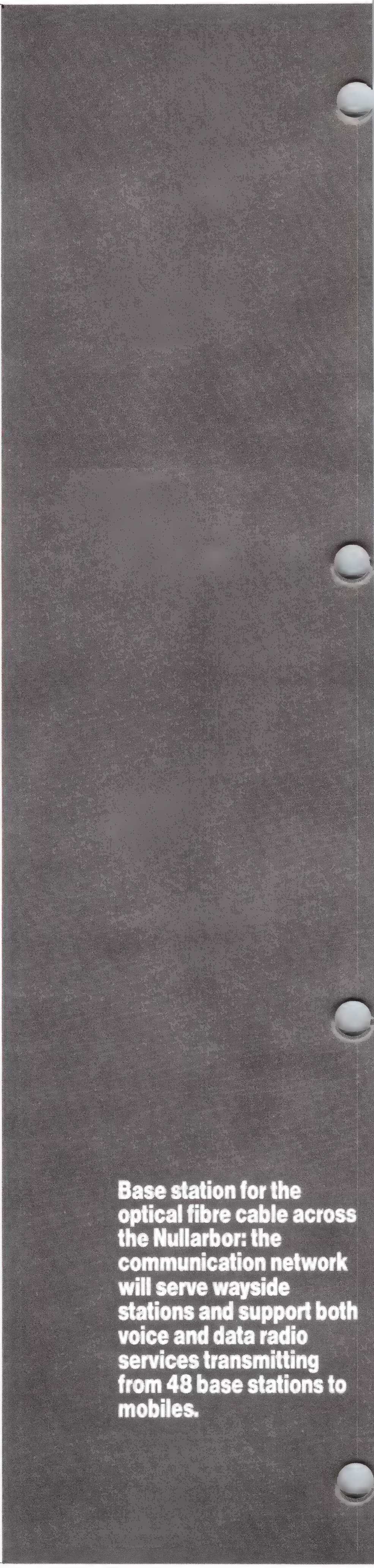
The first Plasser 09-16CAT (Continous Action Tamping) machine bought by Queensland Railways at Strathpine station, Brisbane, after being officially handed over to the Queensland Minister for Transport, Peter McKechnie.

AN STREAMLINES ITS OUTBACK RAILWAYS WITH HIGH-TECH SOLUTIONS

Freight is Australian National's main business. The Trans Australian Railway (TAR), from Port Augusta in South Australia to Kalgoorlie in Western Australia, and the Central Australian Railway (CAR), from Tarcoola to Alice Springs, have to compete for freight with government-subsidised road transport over these routes and AN must continue to reduce costs, improve train reliability and cut transit times.

Two important improvements are being introduced to serve these aims: an integrated UHF voice and data radio network using an optical fibre cable as the chief transmission medium, and a safeworking system similar to the North American Advanced Train Control Systems (ATCS). The new communication system is being installed over the TAR, while the safeworking system, being developed by AN and called Austrac within AN, will be used over the TAR and at three crossing loops on the CAR.

The 1700km Trans Australia Railway, which includes the longest section of straight track in the world, was built before 1920. There are 10 small railway communities on the TAR and at three places on the CAR.



Base station for the optical fibre cable across the Nullarbor: the communication network will serve wayside stations and support both voice and data radio services transmitting from 48 base stations to mobiles.

Features of the two railways are summarised below:

	TAR	CAR
Length of line	1700km	830km
Number of crossing loops	43	12
Number of loops to have electric switches	38	3
Average length of crossing loop	1600m	1850m
Average length of section	35km	65km
Train density per week - freight	28	16
- passenger	10	6 (max)
Maximum speed - freight	100km/h	100km/h
- passenger	110km/h	110km/h
Current maximum train load	5500 tonnes	5500 tonnes

Towards the end of 1986, AN management realised that the success of existing innovations and further improvements planned would be limited by the inadequate communications system on the TAR, an old open-wire pole line. Circuit quality on the pole line is variable, particularly in heavy rain. In summer, outages of up to eight hours in the early mornings are caused by the "Nullarbor Effect", a phenomenon caused by severe attenuation of the signal strength as a result of moisture on salt-encrusted insulators. (The prevailing winds carry salt-laden air inland.)

Telecom already had plans to install an optical fibre cable across the Nullarbor, and AN decided to pay for two fibres in the cable. The optical fibre cable communications network will serve wayside stations and support both voice and data radio services transmitting from 48 base station sites to mobiles when it comes on line by October this year.

The mobile radio system has one data and three voice channels — train control, maintenance and engineering services. Each channel will have a six-frequency plan to overcome overshoot interference on the essentially straight-line route. All frequencies have been assigned in the 403 to 420 megahertz band. Overlapping mobile radio coverage over the whole route ensures that adjoining base stations provide continuous coverage should a

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single base station fail.

The mobile radio antenna supports range in height from 30 metres to 90 metres. Precast concrete guy wire anchors were transported to each site, easier and cheaper than mixing concrete on site. Masts up to 50 metres in height were assembled on the ground and positioned by a mobile crane.

The mobile radio data channel will transmit data at 4800 bits per second between the train control centre at Port Augusta and all fixed installations at the sidings and in locomotives. The data transmission system includes "radio smart modems" to reduce errors, an important feature as locomotives are expected eventually to travel at 140km/h and the system will need to cope with significant multipath fading.

All lineside equipment is housed in concrete shelters fitted with heat-reflecting cladding to keep internal temperatures well within the equipment operating limits of +5 to +50°C. The shelters were made from modular concrete culverts sealed to exclude all dust and water. Foundations for the shelters are six 200 litre drums filled with concrete.

Separate 48v and 12v power supplies were provided for the transmission system and the mobile radio system to enhance system reliability. Solar power is used at 72 per cent of the sites. AC mains power is used where available.

Because the TAR is so remote, the communications system was designed for maximum reliability. A 2 Mbit/Sec service, leased from Telecom Australia on their digital microwave radio service, will provide a back-up service for critical circuits, and a powerful SCADA (supervision, control, and data acquisition) system will continuously monitor the whole TAR installation from Adelaide.

The data/voice radio communications possible when the optical fibre cable comes on line will enable AN to install an advanced safeworking system developed by AN staff known as Austrac. Alternatives to a conventional system using wayside signals and track circuits were carefully considered. Austrac is based on the North American Advanced Train Control System and has several advantages over a conventional system — lower maintenance, installation and future siding extension costs, and exchange of real-time data and instructions between trains and control centre-based management systems.

AN recently awarded a contract for installation of the system, which will provide for the radio control of electric switch machines at 41 crossing loops (38 on the TAR and three on the CAR). Since 1978, AN has gradually introduced two-person trains throughout its network. Some trains on the TAR and CAR are still being operated with three-person crews because points at crossing loops have to be manually operated. Three-person crews are not necessary with remotely-operated electric switches.

Other benefits are increased train speeds, reduced penalty payments, locomotive fuel consumption, brakevan maintenance, brake block wear and terminal costs, and improved overall transit times.

The contract also provides:

- On-board computers and in-cab screens on 30 locomotives that enable the continuous exchange of data with the wayside base stations on the TAR, and the display of proceed authorities to the locomotive drivers.
- Train detection and safeworking clearance based on fixed transponders.
- All the vital safeworking and communications equipment at the control centre to initially support two train controller work stations and interact with AN's Traffic Information Management System (TIMS).

All equipment for the switch machines will be housed in ferro-concrete huts with power provided by solar panels.

Dual-control low-voltage switch machines will minimise train delays should the electrical control system fail.

The system proposed for installation on a locomotive provides for all on-board information to pass through the on-board computer (locomotive processor). Track segment and radio coverage data is downloaded to the on-board computer at the beginning of each journey. The axle generator/odometer provides real-time train speed and location data.

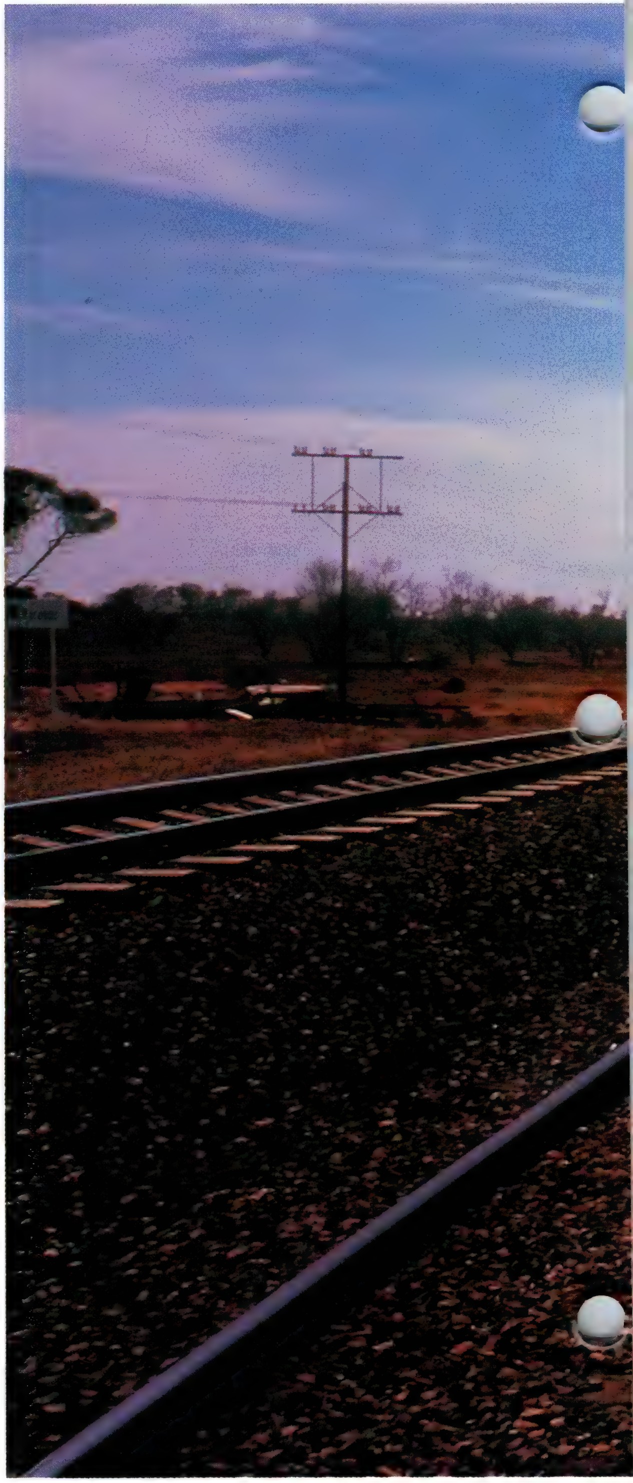
The on-board system will know when to "look" for a track-mounted transponder, sounding an alarm if it is not found. Information from this source also provides countdown to the end of the driver's current proceed authority.

An end-of-train detection system is provided for giving end-of-train clearance and train integrity advice at stations and mid-section points.

Although a locomotive health system is not included in the present contract, provision has been made for it to be included later.

The optical fibre cable across the Nullarbor will enable AN to install Austrac, an advanced safeworking system developed by AN staff.

Solar engery collector at a base station for the Nullarbor optical fibre cable. Solar power is used at 72 per cent of the stations.



Open wire pole line beside the TAR on the Nullarbor: In summer, transmission disruptions of up to eight hours are caused by the "Nullarbor Effect", a severe attenuation of signal strength caused by moisture on salt-encrusted insulators.

The following information will be displayed on a main menu screen for the locomotive driver:

- Current and following proceed authorities.
- Position of the train on the TAR (given as kilometres from Port Augusta).
- Distance in kilometres to the end of the current proceed authority.
- Authorised track speed.
- Actual train speed.
- Details of speed restrictions, the authority for the restriction and whether speed restriction targets are exhibited or not.

The train speed and location information is updated every second.

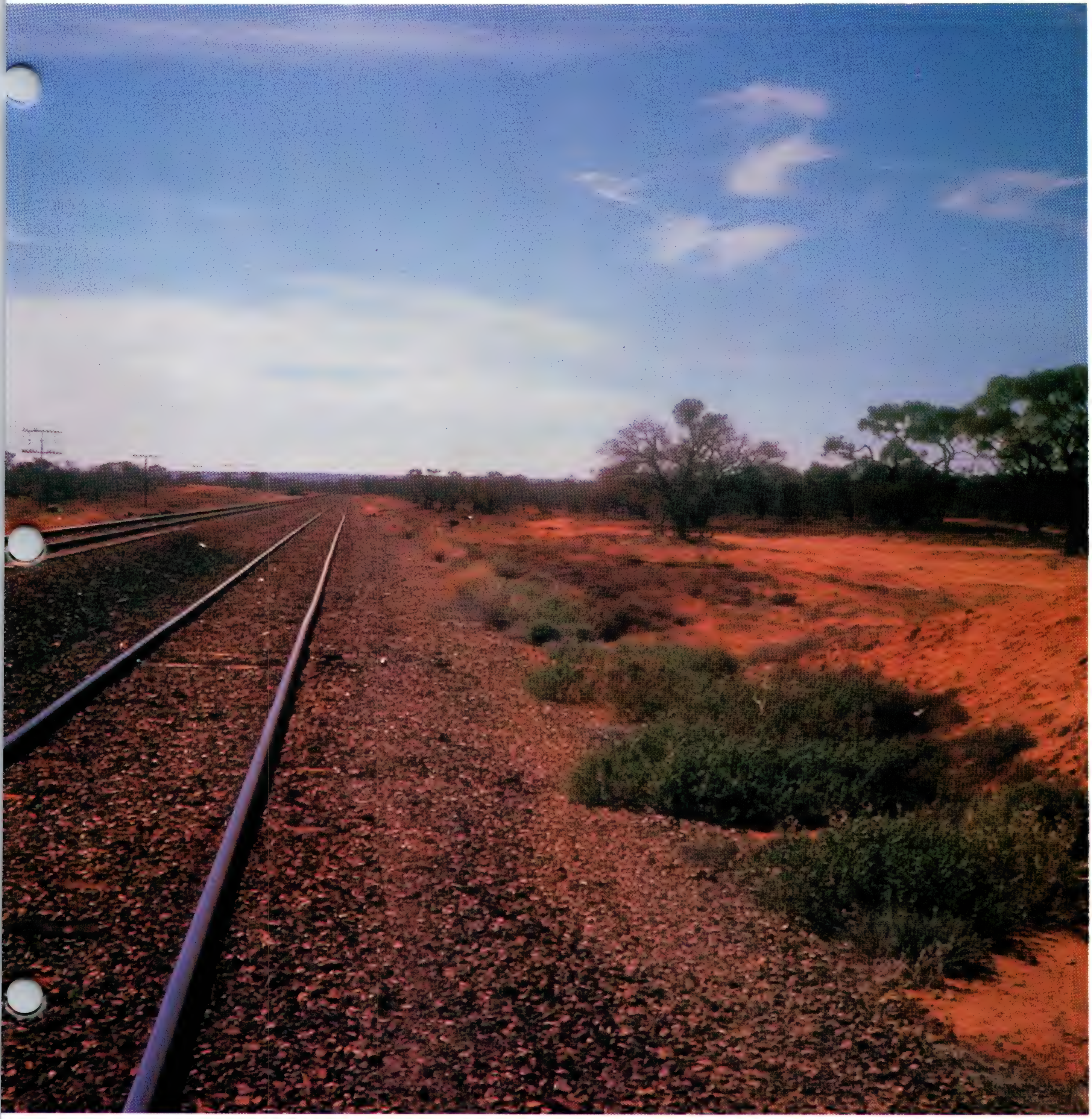
The locomotive driver is required to acknowledge the end-of-train signal and the proceed authority by pushing a button. The train's speed and location is to be reported to the train control centre every five kilometres or five minutes, a transmission also triggered when the train encounters a transponder, stops or starts moving.

The train driver will be able to call up other information, such as train consist and load.

Facilities to allow following train "proceeds" are to be provided in 17 sections on the TAR. The arrangement of transponders and end of train magnets makes allowance for a future maximum siding length of 2.5 kilometres.

If a transponder is damaged, temporary transponders, which can be field coded to any address, will be used until a permanent replacement can be obtained.

Each train controller's work station at the central office will have two colour display screens. One will



usually show an overview of the territory being controlled, the position and direction of travel of all trains, the extent of their proceed authorities, and temporary track closures. The controller can display this overview on either screen, or a more detailed display, any TIMS screen or a page of alarms.

Train controllers will be able to apportion the area under control between them. During quiet periods, one controller can control the whole territory.

Train controllers will also be able to employ extended route setting and automatic cross techniques. Extended route setting allows a route spanning a number of sections to be set. After the train controller has selected the origin and destination points, the system aligns the switches, one station at a time, and then transmits corresponding proceed authorities to the relevant train. Once the automatic cross technique has been selected for trains to cross at a particular station, the system will automatically set the route and transmit the proceed authorities for the trains to cross.

System checks are then made in the vital control computer. They ensure that the section is free for the passage of the train, that no conflicting proceed authority exists, and that the switches (if any) in the area requested are correctly set and locked. Only then is the proceed authority transmitted to the train. After receiving a proceed authority to traverse a set of switches, a train will approach-lock the points and confirm the approach-locking by direct communications with the vital control equipment at the respective switches.

Provision will be made for special "slow orders" to be transmitted to a train seeking entry into a section blocked by events such as permanent way works or a disabled train. The unauthorised entry of a train into a section will be detected and the central office alerted. At this stage, no provision has been made within the train braking system for direct intervention in such circumstances, but this feature can be added to the control system.

All events concerning the movement of trains will be logged, including logging by work station keypress.

The safety of the overall Austrac system is in the hands of safety computers using VIPER (verifiable integrated processor for enhanced reliability) processors developed in 1987. The Austrac system will be connected to the mainframe computers running the TIMS so that real-time data can be exchanged. Integration of these services with other computer systems has economic benefits for AN.

Austrac benefits for the TAR and CAR could be of equal use to other railway systems, and provision has been made for expanding the system. The safety computers at the control centre have the capacity to deal with three times as many trains loops and modems.

The new communications and safeworking networks will mean cost savings in field maintenance. All equipment on the TAR will be maintained by small maintenance teams at Port Augusta and Kalgoorlie.

Austrac should go into service by the third quarter of 1990. Australian National is confident that the overall reduction in train transit times, together with lower operating costs and increased reliability of train arrivals, will lead to a gain in market share of 50 per cent of the current road freight task over four years.

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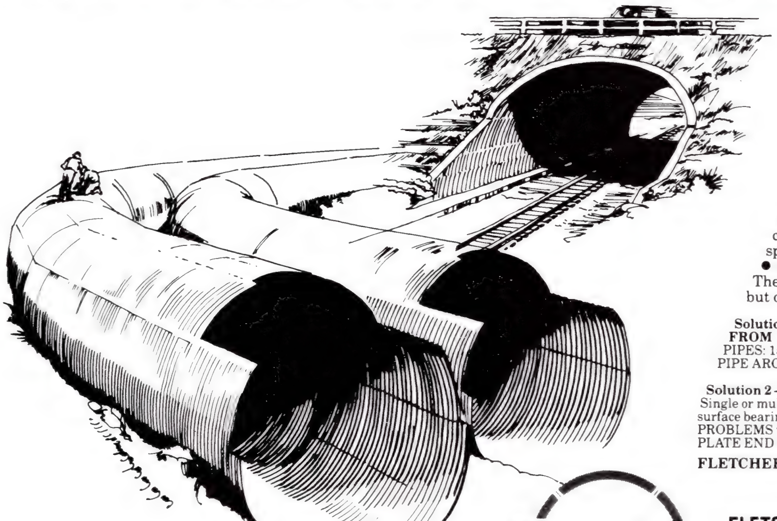

V/LINE'S FUTURE DIRECTIONS

The Chief Executives of Australia's rail systems will be writing articles for a new Network series. Here the Managing Director of V/Line, Keith Fitzmaurice, looks at the system's future.

This is an exciting time for public transport in Victoria. Since its incorporation in 1983, V/Line has made the radical changes needed to meet market demands and incorporate new technology, as well as significantly improving its financial position.

V/Line's freight and passenger business is increasing largely because of public and business confidence in its ability to provide reliable market-based services.

Its corporate direction for the next five years is described in a recently-released brochure. The corporate plan to 1992 has been formulated in the context of of the State Transport Authority Plan (STAP), which reviews V/Line's longer-term outlook in the light of a wide range of policy options.

Although the five-year corporate direction has been decided, future plans and strategies will be influenced by a number of factors. These include the outcome of Melbourne's bid for the Olympic Games in 1996, and developments affecting government policy and the government position on STAP. Changes flowing from the STAP process will be reflected in future corporate plans.

Corporate strategies have until now focused on reducing costs by improving operations and work practices and reducing staff numbers. The corporate plan to 1992 places greater emphasis on productivity

Keith Fitzmaurice, Managing Director of V/Line: By 1992, V/Line and State Rail aim to capture 40 per cent of the container freight market between Melbourne and Sydney.

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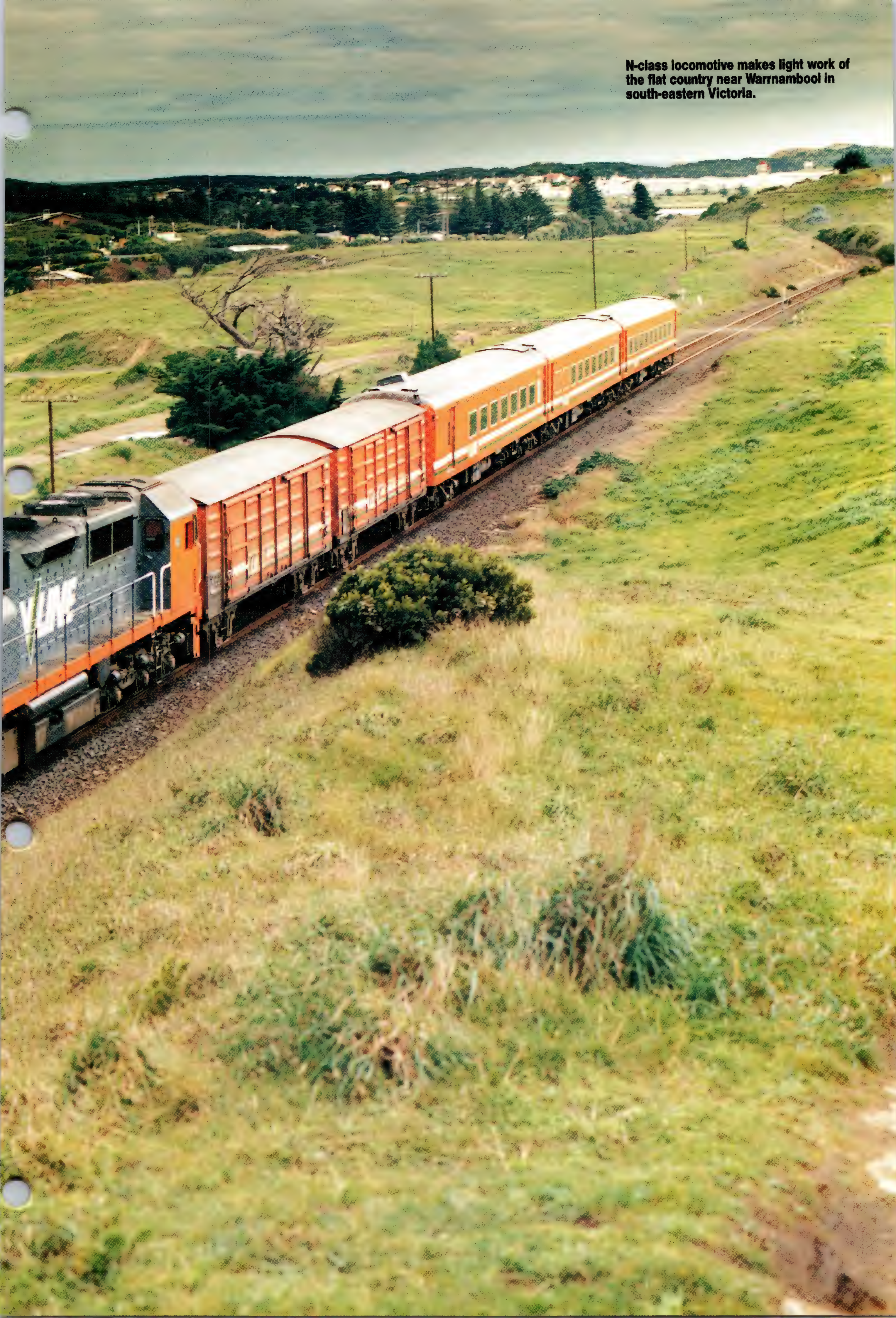
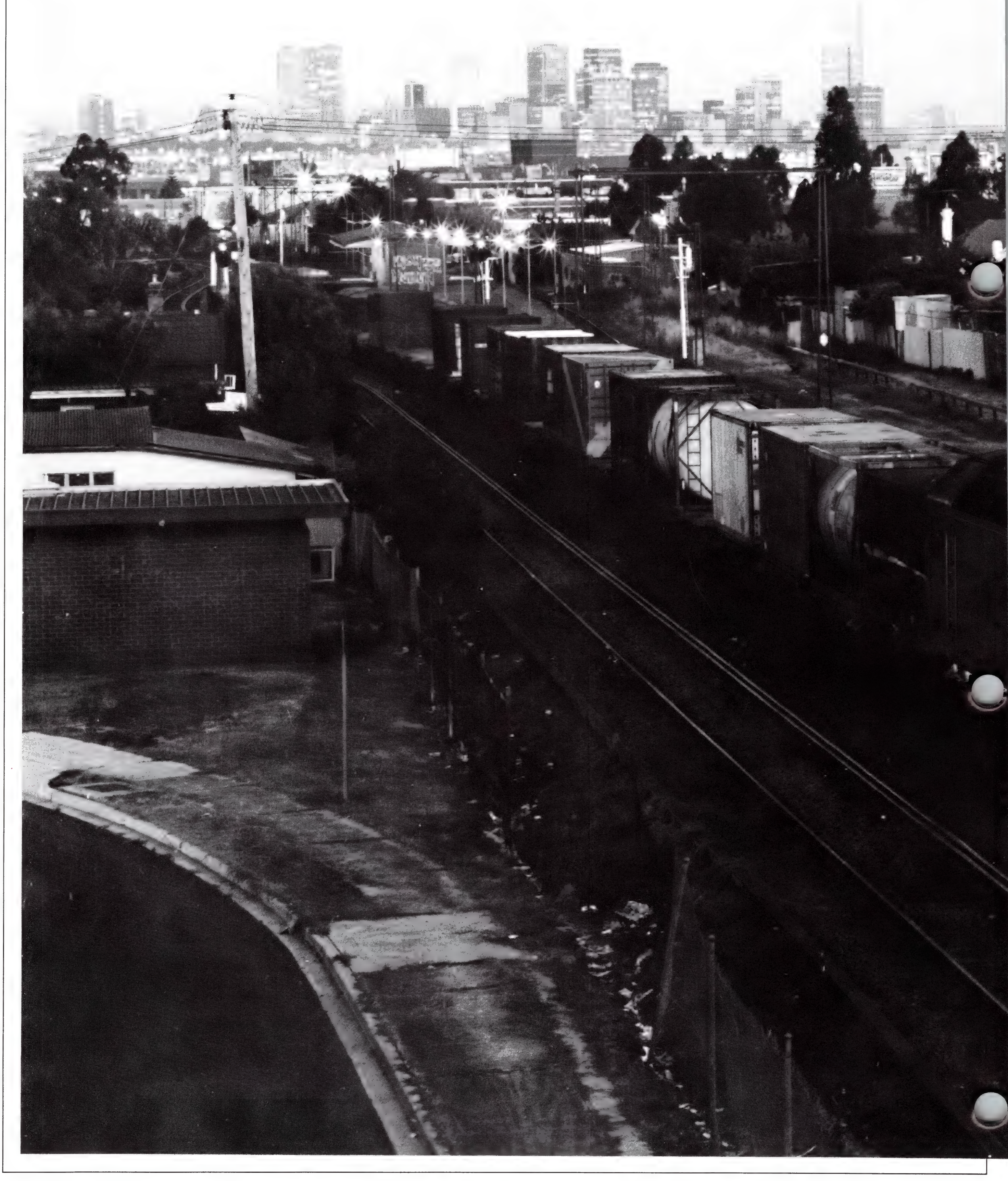


N-class locomotive makes light work of the flat country near Warrnambool in south-eastern Victoria.



gains from new investment in equipment such as computer and information systems.

Having changed its operating structure, V/Line is now in a position substantially to increase its market share, particularly for interstate container freight services. It is forecasting a 20 per cent growth in freight tonnage to 12.7 million tonnes, and similar growth in passenger service patronage to 6.26 million by 1992.

In freight, there is a greater emphasis on selective growth of services. The main growth area is interstate container traffic, where a 33 per cent increase in tonnage (from 3 to 4 million tonnes) is planned in the next four years.

V/Line's strategy for passenger services is based on the retention of all rail services. The road coach network will continue to expand in areas not covered by rail, and passenger rail services will be improved, with an emphasis on quality.

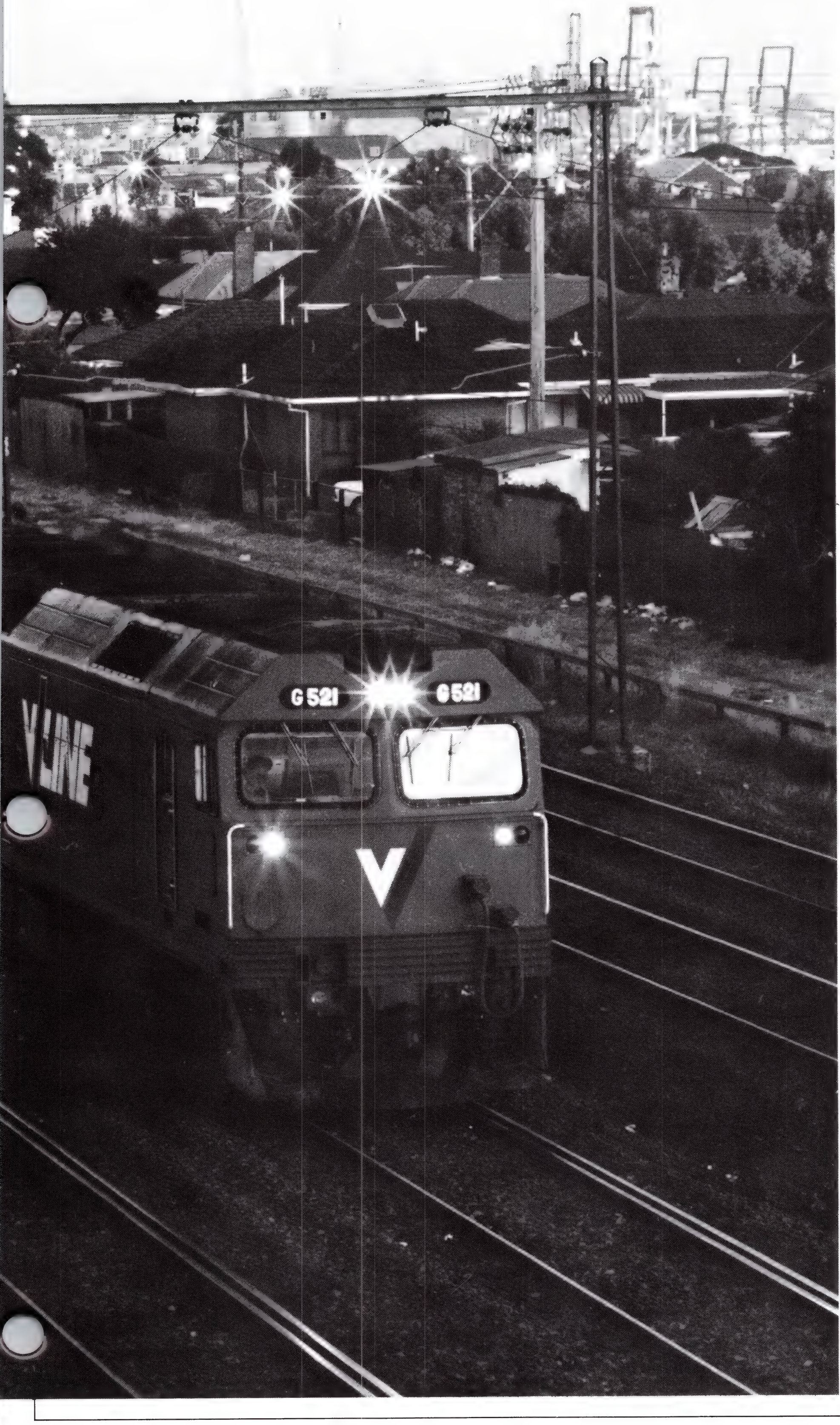
The viability of rail services for passengers depends to a large extent on the continued development of the freight business, which is central to maintenance of the rail network.

Growth of the freight business will require further substantial savings in operating costs, and improvements in service and reliability.

The major growth opportunities for freight are in highly-competitive markets typified by low freight rates. Freight revenue can thus not be expected to increase at the same rate as the volume of freight moved. Even so, it is expected that by 1991-2 V/Line's freight traffic will be generating revenue above operating costs, with an average profit margin of 15 per cent of sales revenue.

The freight services' operating loss, the difference between operating costs and revenue earned, will be reduced to $71 million by 1992, a 50 per cent reduction on the loss for 1987-8.

The corporate plan to 1992 introduces the concept of community service obligations (CSOs) by which non-commercial segments of V/Line's business would be separately accounted for. These are the segments that do not meet commercial



V/Line Superfreighter leaves Melbourne in the late evening bound for Adelaide.

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The Goninan/GE Dash 8 locomotives — the first to be built outside the USA — are setting new standards in diesel locomotive performance. Under licence to the General Electric Corporation of America, Goninan is building these locomotives for Westrail, Mt. Newman Mining and Australian National.

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performance standards but nevertheless fulfil important community needs. After making allowance for CSO payments, V/Line's cost recovery on freight services is forecast to be 92 per cent by 1992.

Information gathered by the Federal Interstate Commission in its recent examination of vehicle registration charges suggests that heavy articulated vehicles do more damage to the roads than they are accountable for in their annual registration fees. They are in fact heavily subsidised by the private motorist, who pays the lion's share of road maintenance funding.

If road haulage vehicles fully contributed to the cost of maintaining the roads they use, it would amount to an additional charge of 1 cent per net tonne kilometre. This would have a beneficial impact on V/Line's financial performance, allowing for an upward revision of average freight rates and generating an extra $20 to $30 million in freight revenue.

In the next four years, V/Line is planning a 25 per cent increase in its average freight train payload, the gross weight carried by each freight train. Even though the total freight task is to increase by 20 per cent, there will be an 8 per cent reduction in train operating hours and a 38 per cent reduction in operating locomotive hours.

These improvements in freight operations reflect the introduction of block trains (trains with a set number of wagons running on regular schedules) and the reduced role of shunting and marshalling.

As well as making these operating changes, V/Line will be investing in the redevelopment of its main Melbourne container terminal at South Dynon. This will keep handling capacity in line with rail capacity and market demand. By 1992, annual container throughput is expected to increase threefold from 90 000 to 270 000 containers.

The $20 million investment in new tracks, handling equipment, and other facilities will also accommodate dock traffic and release part of the Dynon terminal for use by freight forwarders.

Other freight-related investments include the establishment of new wagon maintenance facilities and a new rolling-stock control system.

For passenger services, by 1992

V/Line freighter: The system expects a 33 per cent growth in interstate freight by 1992 — an increase from three to four million tonnes.

V/Line will introduce new fare structures and ticketing systems, state-of-the-art passenger information display systems at Spencer Street Station, and the latest on-board catering and entertainment facilities on interstate trains.

The statewide station improvement program will be continued. A new road/rail interchange facility is planned for Spencer Street Station, and there will be other improvements to the station complex.

Patronage of passenger services has grown by 33 per cent since 1983, and is forecast to grow to 6.26 million by 1991-2. Continued growth of the rail passenger business will require an investment of an estimated $82 million to 1993-4. This is the cost of expanding the capacity of the rolling stock through refurbishment of existing carriages and acquisition of new rolling stock.

The modernisation of V/Line has been accompanied by a reduction in the workforce of almost 3500 people from July 1985 to June 1988. Further productivity improvements outlined for the next four years should result in a reduction by attrition of 1900 V/Line staff, to about 8900.

The emphasis will be on improving staff skills to meet V/Line's needs. Employees in redundant positions will be encouraged to retrain so that they can be transferred or redeployed to positions where their new skills are needed. Award restructuring and a raising of skill levels will allow for a wider range of tasks to be handled by fewer people.

Computerisation will continue to play an important role, particularly in freight invoicing, train monitoring, operations control, reservations, maintenance, and accounting systems.

As well as a commitment to new technology, there is a dedication to improving staff skills, evidenced by such staff-based initiatives as the driver training program with simulators.

Confidence in V/line's services has been renewed by better services and active participation and consultation with the unions at all levels.

In the next five years, V/Line will be directly and indirectly affected by the possibility of a private-enterprise-initiated VFT (Very Fast Train) on a Melbourne-Canberra-Sydney route yet to be determined.

At the same time V/Line will be studying the feasibility of a Fast Freight Train (FFT) to Sydney through the existing north-east corridor, reducing the transit time to nine hours.

Developments in the road industry and the completion of the Hume Freeway are among the factors that could affect V/Line freight, the FFT in particular.

V/Line, in conjunction with the other rail systems around Australia, is determined to increase its share of freight traffic between the capital cities. By 1992, V/Line and the State Rail Authority of New South Wales (SRA) aim to capture 40 per cent of the container freight market between Melbourne and Sydney.

There is every possibility that the introduction of faster and even more efficient services in the following decade will make interstate long road haulage a thing of the past.

Promoting rail travel: Interstate trains are to get the latest on-board catering and entertainment facilities.

ALL THE WORLD'S RAILWAYS
JANE'S TRAINS

Jane's World Railways 1988-89

Edited by Geoffrey Freeman Allen

Jane's Transport Data, 1989, £95.00.

The 30th edition of Jane's World Railways, acknowledged as the most comprehensive guide to the world's railway systems, to manufacturers of railway products, and to the massive infrastructure that supports rail services in all countries, has been extensively updated, with 200 new photographs.

Major Australian locomotive manufacturers are well represented. It is heartening to see that the Clyde entry features illustrations of the Clyde/EMD AT 42 C diesel-electric locomotives now being delivered to Australian National. Comeng too has an impressive entry, with interesting tables for current manufactures. But much more information could have been provided by the Goninan organisation as one of Australia's major manufacturers, and the Walker information is minimal.

Railway Systems in Australia command 19 pages in Jane's, with the State Rail entry being the most effective. The information provided by all Systems is extensive and appears to be accurate at the time of Jane's deadline. The Westrail section in particular deserves commendation for its presentation.

In reviewing Jane's World Railways, one is constantly aware of the size of the task of editing and publishing nearly 900 pages of error-free material presented in easily understood layouts. Full credit must go to Geoffrey Freeman Allen and his staff at Jane's Transport Data. At £95.00 "Jane's World Railways 1988-89" is an essential reference volume for libraries, and railway manufacturers seeking to expand their markets. Copies are available from the publisher at 163 Brighton Road, Coulsdon, Surrey, CR3 2NX, England.

WHO'S WHO AND MAKES WHAT
THE RAIL GAZETTE

Railway Directory and Yearbook 1989

Edited by Chris Bushell

Reed Business Publishing, 1989, £34.00.

Publishing an accurate review of the world's railways and railway manufacturers is no simple task. Railway Gazette has done so successfully for almost a century, for this is the 94th edition.

The editor, Chris Bushell, has improved on the coverage in previous volumes: the 1989 edition introduces 26 new metro maps, including Hong Kong, Beijing, Chicago, Singapore and Mexico City. These complement the excellent maps of the world's main line railways, which are subject to regular review. This year, the Western Australian, New Zealand, Spanish, Portuguese and Czechoslovakian maps have been updated.

The manufacturers section of the directory has two new sections, dealing with workshop equipment, and microprocessing, electronics, and communications, fields that justify coverage as new technology transforms traditional railway practices.

Railway Directory lists more than 8000 senior staff of railway systems, manufacturers and consultants, and an index of personnel at the back of the book enables the reader quickly to identify individuals.

The Australian section of the directory is comprehensive, although inevitably some personnel changes have taken place since the yearbook went to press. Still, if all the world's systems are as accurate as the Australian section, full marks to the editor and publisher.

The 1989 Railway Gazette Directory and Yearbook is an excellent reference guide that should be in the libraries of all railway systems and manufacturers – excellent value at £34 ($68). Copies are available from the publisher.

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TRAVELLING BY RAIL IN AUSTRALIA

AUSSIE RAILS

Australia by Rail

by Colin Taylor

Bradt Publications, 1989, $14.95.

Rail travel guides such as the Eurail Guide Annual from Saltzman and Fistell's America by Train are brisk sellers. Now they have been joined by Dr Colin Taylor's detailed guide to rail travel in Australia.

This slim volume provides details of all major Australian trains and many intrastate and even suburban services, as well as of the various travel passes available. It also suggests itineraries for using the Austrailpass available to overseas visitors.

Australia by Rail is probably the most comprehensive work available if you plan extensive rail travel in Australia. But services and timetables should be checked as some of the information is already dated.

The black and white illustrations in the book are unfortunate; several were taken more than a decade ago and do not reflect the modernisation of Australian trains in recent years. Author Colin Taylor told Network the illustrations were not chosen by him and came as a surprise. The second edition will carry more recent pictures.

Readable, full of friendly advice, and spiced with the humour one expects from this author, Australia by Rail is recommended to those planning extensive rail travel in this country.

One of the benefits of seeing Australia by rail: the lounge car of the Queenslander.

MELBOURNE'S CABLE TRAMS ON VIDEO

TRAMS REVISITED

Commuting by Cable

ARE Video Melbourne, $39.95.

One of the antecedents of the Metropolitan Transit Authority of Victoria, an associate member of Railways of Australia, is the Melbourne and Metropolitan Tramways Board. Commuting by Cable, one of the most entertaining, well-presented contributions to Australia's transport history made for some time, tells its story.

The video relies on early film, much of it taken by amateur photographers, so that the image quality is not always top class. But good editing, a fine voice-over commentary, and the skilled use of music combine to produce excellent results.

Its subject is the cable trams that formed the backbone of Melbourne's street public transport system in the late 19th and early 20th centuries, with one route lasting till World War Two. Had the producers of this video set out to demonstrate how a cable tramway system operated and its importance to the community by shooting new film now, they could hardly have done better. And it is certainly more than just a record of what cable trams looked like and did. There are family scenes, scenes in the workplace, and scenes of contemporary Melbourne. Melbourne's suburban railways get a mention, as do the paddle-steamers that operated in Port Phillip Bay.

At its peak, the Melbourne cable

tramway network was the second largest in the world. Only Chicago was bigger. Today the cable trams in San Francisco alone survive, now an international tourist attraction and a national monument. Commuting by Cable relies heavily on the work of Mr Neville Govett, a Melbourne amateur photographer now living in Brisbane. Mr Govett appears in the film and his recollections add colour to the commentary. (Incidentally, he was a passenger to Perth on the ROA's Bicentennial Steam Train in 1988.)

For those with an interest in history, transport history in particular, this video is strongly recommended.

125 YEARS OF NZ RAIL HISTORY

COUSIN SYSTEM

New Zealand Railways: The first 125 years

By David Leitch and Bob Stott

Heinemann Reid New Zealand, 1989.

New Zealand's first railway, from Christchurch to Ferrymead, was opened on 1 December 1863, providing "gratuitous rides as well as immense amusement to crowds of colony bred young people". In 125 years this 7km steam-powered system has grown into a nationwide transport network comprising over 4200km of track and more than 400 diesel-electric and electric locomotives.

In his foreword to this official history, the present Chief Executive of NZR Corporation, Mr Kevin Hyde, says: "It is apparent that the frequency of change is increasing as never before, and the forces of change are pressuring organisations from all directions; Railways is no exception." What this book does is to document in a very readable fashion the changes across the whole transport spectrum in New Zealand in the last 125 years.

Australian railwaymen have a natural affinity for their New Zealand cousins, and the book notes the decision taken at the beginning of this century "for New Zealand to be represented at the Annual Conference of Australian Railway Managers, in the belief that this exchange of ideas would be of further benefit in the increasingly complex operation of the burgeoning NZR". Those links still hold.

Australian readers will have no difficulty understanding the political influences that have shaped New Zealand Railways developments. There are many parallels in the experiences of Australia and New Zealand. In both countries governments have shaped railways to suit their own purposes.

The book emphasises the business role railways have been called upon to play from the very earliest days, when freight was moved inland from the wharves of many ports, to today, when the bridging of Cook Strait with railway-owned ferries provides a through freight service from North to South Islands. The issue of road against rail competition raised itself as early as 1893. In their report for that year, the NZR Commissioners noted that traction engines were hauling wool that could have been carried by branch lines: "Such a practice is carried on at the expense of the ratepayers who maintain the roads, and who as a rule derive no benefit from it. The persons who gain are the owners of the goods and the proprietors of the traction engines."

New Zealand's rugged terrain has produced some notable feats of railway engineering and some operating headaches. The latter were lessened with the completion of the electrification of a major portion of the North Island main trunk line in 1986, just at a time when government policy had reduced restrictions on long-distance road transport, an act which had a significant effect on rail's market share.

Leitch and Stott do not dwell on technical matters but point out some interesting "firsts", including the first use — on a section of the North Island Main Trunk line in 1938 — of centralised train control (CTC) on a railway outside North America.

Almost 100 photographs illustrate this work, which is a worthy addition to the high-quality railway literature New Zealand has consistently produced.

RAIL FLAW DETECTION VEHICLE CLAIMS A WORLD FIRST

A specialised rail flaw detection vehicle, designed and manufactured in Western Australia, is claimed as a breakthrough in railways technology.

West Australian Speno Rail Maintenance (Aust) Pty Ltd has been awarded a two-year contract by the State Rail Authority of NSW to operate the vehicle over its entire network to locate rail fatigue defects.

This will help reduce derailments, caused by broken rails.

The flaw detection vehicle will be equipped with both gliding shoe transducers and special high technology wheel roller search probes that hug the rail head. The company says this is the first time in the world that the two systems have been used together in one vehicle. The combination will ensure more of the rail is examined to provide maximum detection of flaws.

"This equipment, designed specifically for the needs of the NSW rail network, can easily be adapted for use on any other state rail system," said Mr Ben Lombardo, managing director of Speno Rail Maintenance.

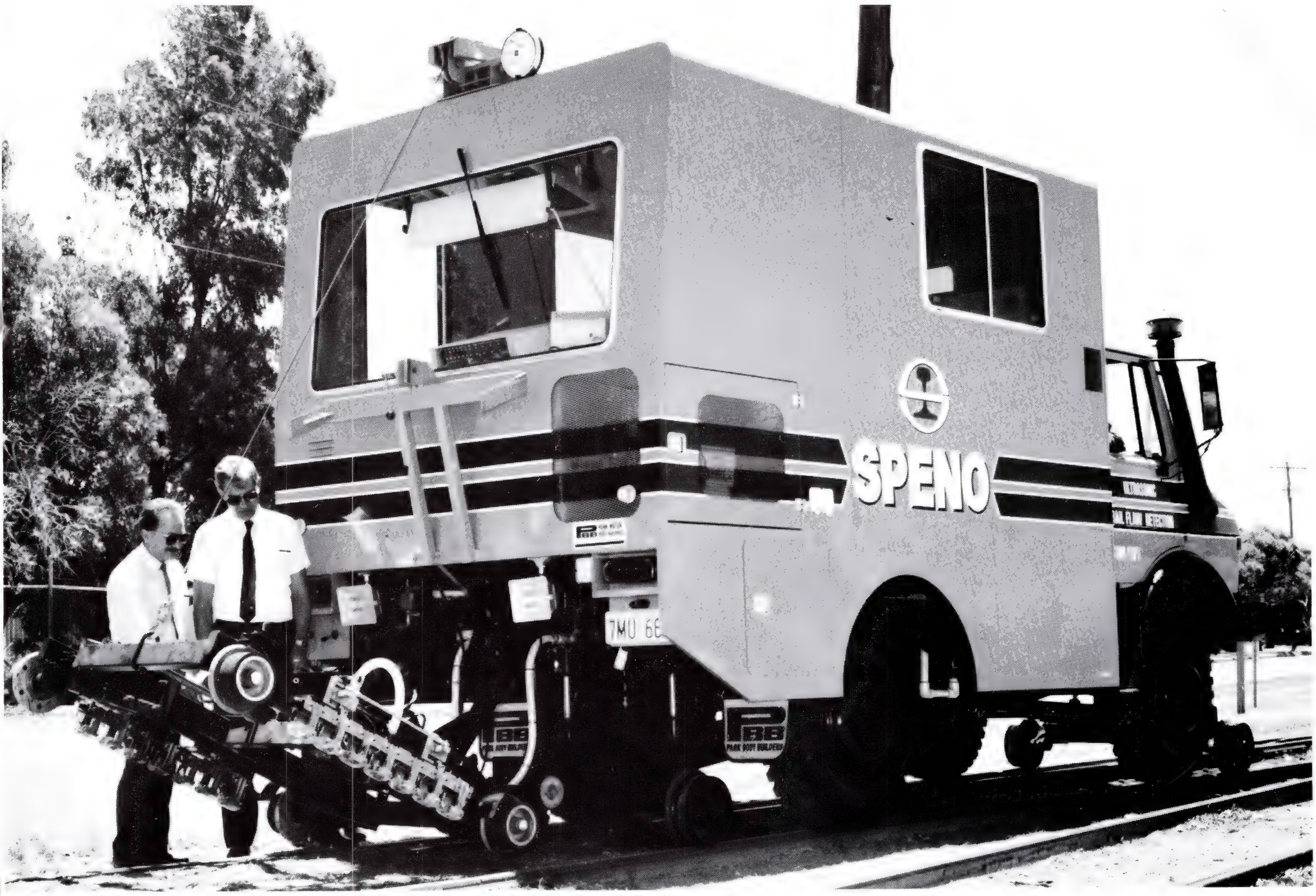
"In addition to the current contract with State Rail Authority of NSW, we are also contracted to Australian National, Mt Newman Mining, Hamersley Iron, Robe River and Goldsworthy Mining.

"Some of these railways operate with the highest axle-loads in the world, under the most stringent operating conditions."

Speno is now expanding into the overseas market for rail flaw detection equipment and is awaiting the results of overseas tenders. The company has recently been awarded a $5 million contract by Australian National for the sale and operation of specialised rail-grinding equipment.

Speno's Universal Rail Rectifier/URR 36-2 will be used for removal of surface defects and irregularities on the rail head. The company says the use of equipment over the whole AN network will lead to faster and more efficient freight and passenger rail services and reduce operation and maintenance costs.

For more information, contact Mr Ben Lombardo, Speno Rail Maintenance, 11 Robinson Avenue, Belmont WA 6104 (telephone (09) 479 1499, fax (09) 479 1349).



Ben Lombardo, managing director of Speno Rail Maintenance (Australia), and Richard Meyer, field services manager of State Rail of NSW, check the trailing equipment of the flaw detection vehicle after a test run near Bassendean, WA.

PVC LINER SAVES A CRUMBLING CULVERT

Lightweight spirally-wound pvc piping has provided an economical and practical solution to the problem of a corroding corrugated steel culvert under a railway track near Broken Hill. The smooth-surfaced liner was installed without disturbing the railway track. It has the same hydraulic efficiency as the original corrugated culvert, even though its diameter is smaller.

Australian National called tenders for the design and repair of the double 2m culvert, which had been installed 1m under the main transcontinental railway during its construction some 20 years ago. Although the culvert had been expected to last 50 years, the unusually acidic backfill had badly corroded the steel.

The contract was awarded to Rib Loc Australia Pty Ltd, who had worked with consulting engineers Pak-Poy & Kneebone to design a structurally sound replacement.

The design optimised the combination of structural strength and hydraulic capacity, using a 1 500mm-diameter spirally-wound pvc pipe as the interior liner. The liner was wound to the desired length by a special machine. It was easily manhandled into position outside the culvert. A steel mesh reinforcement was fixed around the liner. The assembled mesh and liner were then pulled into position along a track into the old culvert.

"The flexible nature of the liner enabled it to be pulled into an oval shape and twisted to fit the varying alignment of the original 1900mm x 1700mm culverts," said Rib Loc's marketing director Peter Menzel. "Once in place, a high-strength concrete was pumped between the liner and the steel culvert.

"The spiral pvc pipe was used as a lightweight liner to contain the structural body of concrete and mesh, enabling it to be quickly and easily installed without the use of heavy machinery and without disturbing railway operations.

"The Rib Loc liner gave greater flexibility in design to meet specified hydraulic capacity than concrete pipes, which are only readily available in a limited number of standard sizes."

The project was under the control of AN's Port Augusta office. Rib Loc has patented the technique, which offers a new, economical way of replacing failing culverts under railways and roads.

Further information may be had from Mr Peter Menzel, Marketing Director, Rib Loc Australia Pty. Ltd. (telephone (08) 252 1622).

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New Zealand Railways has transformed itself into a world leader in its class. The editor of Rails magazine explains how NZR got its

NEW ZEAL

By Bob Stott

One-person train crews, train control methods that render traditional signals more or less redundant, remote-controlled shunting locomotives, bimodal road/rail freight vehicles, passenger trains paying their way, computer monitoring of rolling stock — all these things are to be found on New Zealand Railways or will be shortly.

None of these developments is unique to New Zealand Railways, but it is difficult to find a comparable system where all of them have been adopted. What is it that has prompted a rail system modest by anyone's standards to become a world leader among lightly trafficked general purpose railways?

The answer lies in the fact that the New Zealand economy, including transport, is among the least regulated in the world. New Zealand's Labour government, now halfway through its second three-year term, inherited a heavily regulated economy in poor shape with a high national debt.

The new government acted to free the economy, abolishing subsidies, selling off some state-owned businesses and demanding that the others turn themselves into profitable undertakings.

To understand the position New Zealand Rail found itself in, it is necessary to know something of the history of rail transport and government policies in New Zealand.

New Zealand's first railway, between Christchurch and its port, opened in 1863, an event marked last year by train excursions and a cavalcade of historic locomotives that attracted thousands of people from within New Zealand and overseas.

That first railway was built to 5ft 3in gauge, and it was followed by a standard gauge line from Invercargill in the far south and an abortive attempt to build another standard gauge line south from Auckland. As early as 1870, it was resolved that future construction would be to 3ft 6in gauge, which is just as well, as the two islands could have ended up with different railway gauges, making impossible the inter-island rail ferry service that since 1962 has bound the two systems into one national carrier.

Early railways mainly connected cities with ports, ports with their hinterland, but gradually the isolated sections were linked by inter-regional trunk lines, a process finally completed during World War Two.

The railway, as in other countries, dominated internal transport until the 1920s and 1930s, when better road vehicles and better roads began to challenge rail's pre-eminence. Then, for the first time, rail had to make a real effort to market its services: its Commercial Branch was re-organised and expanded, efforts were made to attract overseas tourists, and publicity became accepted as a vital part of the operation.

At the same time as road transport began to hurt the railway, concern was being felt at the way road haulers were engaging in cut-throat competition among themselves. In the end, a Transport Licensing Act was passed in 1931, providing for the licensing of road transport of passengers. It was extended to cover goods services in 1933, and in 1936 was amended to include direct protection for rail.

An applicant for a road service licence had to prove a need for a new service, and that its granting would not harm established operators in the area. The applicant also had to provide evidence of capital and expertise and show that the new service would be in the public interest.

The rail protection legislation prevented road carriers from competing directly with rail over distances of 30 miles or more – a limit later raised to 40 miles (1962) and eventually 150km (1977). Carriers could get exemptions if they could prove it was in the public interest, while in more recent years certain commodities were exempted.

Before rail protection came to an end exemptions were numerous, most of them in two classes: perishable goods such as frozen foods, and fragile goods such as earthenware.

With the quantity of road transport controlled and with its competition with rail severely limited, NZR more or less broke even financially, sometimes making a profit, sometimes not. Road carriers' fees paid to government came nowhere near meeting the costs the industry imposed on the roads, but neither was a proper commercial return being received from rail.

NZR nevertheless entered the 1970s in reasonable shape: steam had given way to diesel, the rail ferry service had joined the two parts of the system, a number of rural branchlines had been closed, and rail had played a leading role in the establishment of freight forwarding and containerisation. In the first years of the decade new passenger trains were introduced, with dining services for the first time since 1917.

Then the New Zealand economy went into one its periodic recessions, and the government of the day introduced, among a number of measures aimed at speeding a recovery, a freeze in rail rates and charges for a year. In November 1972, the National administration was voted out and incoming Labour promised to extend the freeze for another three years. By now the economy had picked up, and NZR was having to cope with unprecedented traffic – more than 12 million tonnes in 1973 – all carried at a loss.

In that year, commissioned by the government, American consultants reported on the New Zealand transport industry. Among their

One of the success stories of long-distance train services by New Zealand Railways: The Tranz-Alpine Express in rugged high country on its journey from Christchurch to the west coast of the South Island. (Photograph by Roy Sinclair.)

THE TACTIC HAS BEEN TO CONCENTRATE AS MUCH ON BETTER SERVICES AS ON CHEAPER SERVICES. AND IT HAS BEEN A SUCCESS.

recommendations was the replacement of rail protection by a long distance transport fee designed to ensure that goods best suited to rail would largely stay with rail. The report saw a gradual changeover to a more competitive transport industry and promised worthwhile economies to the nation. But its findings were not adopted.

By 1975, tonnage carried was falling and the operating debt was up to $45 million, plus $2.8 million in financial charges – a lot of money for a country of not much more than three million people to provide. A new National government extended the rail protection limit to 150km, and at the same time switched to a new system of taxing heavy road vehicles: fuel and mileage taxes to be replaced by a new tax based on vehicle weight and axle configuration, the aim being to more closely relate fees paid to road wear caused.

In December 1980, the government announced that the old Government Railway would be abolished, to be replaced by a new Railways Corporation. This would give NZR more commercial freedom and remove the rail from under the direct control of a Cabinet Minister. The government also announced that the 150km limit on road's competition with rail would be retained. In 1981, the electrification of the North Island Main Trunk line between Hamilton and Palmerston North was approved. The 25kV ac system would be used and 4000hp Bo-Bo-Bo locomotives would work this mountainous section of the line.

Studies showed that the electrification would give an adequate return on investment, and the new Railways Corporation Board was looking forward to the challenging task of getting the railways back into the black.

Then the blow fell. A Ministry of Transport report recommending the abolition of rail protection and the virtual delicensing of road transport was adopted by the government. Overnight the economies of the electrification were jeopardised, for the report expected NZR would lose some 12 to 18 per cent of its traffic.

Add to that a sagging economy and NZR's position was not a happy one. The Corporation responded by hiring US consultants Booz, Allen

and Hamilton, who reported in 1984. The consultants outlined how a commercially viable railway could be built up in a deregulated environment, offering a series of possible futures for NZR and calculating the benefits of each. Although many believed that a wholesale reduction of route mileage would be among those options, the consulants did not in fact advocate this. Secondary lines in New Zealand, the study showed, generally made a positive contribution, even if they were not profitable by themselves.
Put another way, the study showed NZR would be worse off in general if the lightly trafficked lines were closed.

On passenger trains, the consultants were not optimistic, but they listed eight options, ranging from stopping all services to investing in equipment and expanding services. If long distance passenger services were to be continued, they would have to be improved. NZR chose to retain existing services and upgrade them, so that today several runs are almost meeting all their costs and making a positive contribution to the overall cost of maintaining the railway system.

Most of NZR's revenue comes from goods traffic, so it was in this area that the consultants concentrated. Their cost saving options ranged from abolishing goods guard's vans to stronger drawgear allowing heavier trains, consolidation of goods depots, and fewer railway workshops.

Booz Allen's report was no surprise to NZR management. The study team had worked with NZR staff throughout and many of the innovations were suggested by NZR people. What the consultants did was to get a picture of NZR, collect ideas from their own and from NZR's experience, test those ideas and quantify them, and finally distill everything into a report. That first report was not the end of the process, for the consultants were retained as implementation started.

Out of all this process came changes to NZR's organisation, which up till then had been on traditional railway patterns. Now freight, passenger and property were split into separate groups, each to be run as a profitable business within Railways. Inside the groups were further sub-groups dealing with long distance passenger, suburban passenger, export freight traffic, forestry traffic, forwarding, bulk, and so on.

But what of the environment in which this reshaped NZR has to work? As was forecast before deregulation, the removal of controls on entry into road transport brought a big increase in road transport activity. Removal of rail protection meant that trucking lines could compete directly with NZR on trunk routes, forcing both to streamline their operations as prices fell. But with more or less free entry into road transport, more and more truckies were appearing, so that now competition among road transport operators was driving prices down even further. Railways suffered, but so did established line-haul road operators, especially at the hands of owner-drivers willing to work long hours for small returns.

The New Zealand economy has been weak for much of the 1980s and is only now beginning to turn. So at a time

One of NZR's 22 Class 30 electric locomotives on the North Island Main Trunk. The locos, closely resembling Queensland Railways' new units in power, size and wheel arrangement, will soon be single manned.

when traffic was in decline or at best static, road operators were not only undercutting rail rates but were also undercutting each other. NZR's streamlining concentrated as much on better services as cheaper services. In-transit care, door-to-door delivery times, frequencies of services and customer relations were all improved as rail worked to maintain its market share.

And it has been successful. Tonne-kilometres have remained more or less static lately, but unfortunately revenue per tonne/km has fallen as competition has driven down prices. NZR's operating costs have consistently fallen, tonnage has remained static and revenue has dwindled.

On the roads, more or less the same thing has happened, with market share more or less the same, costs held, and revenue down to the stage where bankruptcies in the industry are no longer news.

It would be fair to say that both road and rail are now working at rates that cannot give a proper commercial return. The theory, however, is that surplus capacity will eventually decline as the weaker operators go to the wall, allowing the survivors to crank up rates to a level that gives at least a reasonable return on investment.

NZR has taken a number of measures to ensure survival in deregulated New Zealand. Generally, the approach has been to turn NZR around into "a lean and efficient" organisation through the shedding of excess staff, equipment and land, through the rationalisation of services, and through an intense marketing effort.

Since the process began, the staff has been cut from more than 20,000 to under 10,000, with still more cuts to come.

Some of the moves towards higher productivity have been obvious. For instance, all goods trains have run without guard's vans and with only two crew on the engine since May 1987. Work is nearing completion on altering the locomotive fleet to allow for single-manning on most goods trains.

New Zealand Railways has produced a series of well-prepared booklets for staff, each explaining a facet of the agreed changes. The booklet titled "Alternative Train Crewing" says:

"Alternative train crewing is a practical and proven means of improving efficiency and reducing costs. It is not new to this country. Wellington passenger services already run with a single person in the cab, as do all railcar services. In the past, freight trains hauled by electric locomotives in both Wellington and Christchurch have been crewed in a similar way.

"Competition in the freight industry means we must match the improvements in productivity being made by our competitors. Alternative train crewing is one means of doing this."

The booklet says that single-person crewing will apply to all point-to-point main line services, both freight and passenger, with the exemption of trains required to shunt en-route at unattended stations and trains hauled by DA and DJ locomotives.

Independent advisors have found that the move from two-person to one-person crewing would not increase health or stress problems, the booklet says. It points out that wages of locomotive running staff were increased as part of the alternative train crewing agreement, and a two-day training programme will be provided for all locomotive engineers before single-person crewing is implemented on their lines.

The booklet also gives assurances on driver safety and says that there is practically no greater risk to track workers, train passengers, motorists and pedestrians at level crossings.

It lists the criteria and safety standards to be met as single-person crewing is phased in over a two-year period. These include.

- Locomotive engineers satisfactorily completing a two-day training programme.
- Further development work on vigilance devices.
- Improved portable radios for drivers.
- Improved communications in "dead-spots" and tunnels.
- Provision for assistance to fix minor train faults and for emergency shunting.
- Modification and improvements to locomotives to suit alternative train crewing operations, and give better visibility.

Although NZR has used Centralised Traffic Control (CTC) since before World War Two, and although the main trunk lines have used CTC and others single line automatic for many years, some electric tablet areas remain. Now a new system known as Track Warrant Control has been devised, whereby almost all train running information needed by a crew is transmitted by voice by controllers to loco crews. All that is needed in the form of "signals" are points indicators at unmanned crossing stations, eliminating staff at crossing stations in tablet areas.

TWC is also being adopted in areas previously controlled by single line automatic signalling. Under TWC no continuous track circuiting is needed, traditional signals are "out", and only points indicators are required. The system acknowledges that all locomotives are now fitted with radio telephones, which are in addition to and not replacing existing trackside telephones. A train controller continuously in touch with all trains in his section needs no longer to shine a red or green light in front of a train to get the message across.

The NZR Corporation staff booklet on "Proposed Changes in Signalling Procedures" says that TWC has been trialled on the Napier-Gisborne line and has proved to be both a "cost-effective and acceptable operating procedure for the safe movement of trains".

Implementation on other lines will begin in November and all lines where this procedure is practicable will be using TWC in 1990.

There are now eight Train Control Offices – at Auckland, Hamilton, Taumarunui, Palmerston North, Napier, Wellington, Christchurch and Dunedin – and it planned to reduce the number to no more than three.

The booklet says that in conjunction with changes involving TWC, control of the signalling at some stations and all CTC panels will be centralised into Train Control Offices.

"TWC will have greatest impact in Tablet areas where staffing of small country stations to signal trains will generally not be necessary.

"The level of staffing for signalling purposes will also be reduced where the signalling becomes remotely controlled by Train Control.

"The total staff reduction is expected to be about 90."

New Zealand Railways, not a large system by anyone's standard, had five major workshops and several smaller ones. One has now been closed (Wanganui), Addington (Christchurch) has shrunk markedly, and work is concentrated on Otahuhu (Auckland), Hutt (Wellington) and Hillside (Dunedin). Each shop now specialises in an activity – loco overhauls at Hutt, for instance – whereas before each shop used to tackle a wide and overlapping variety of tasks.

Later this year, NZR will join the very few railways around the world operating road/railer vehicles – semi-trailers that run on normal road wheels at the beginning and end of a rail line haul. On the road, they look like any other semi. On the rail, the road wheels are lifted clear of the ground, allowing the trailer to rest on rail bogies. Transit times will improve on a door-to-door basis, goods will not be handled at depots, competitiveness will be improved, and, as a bonus, at least some road haulers will be working with rail instead of against it, each doing what they are best at.

NZR test train of 2080 tonnes en route from the Huntly coalfields to the NZ Steel plant at Mission Bush. Two DX Class diesel electric locomotives provide the power.

Experiments are also about to start with remotely controlled shunting locomotives where the shunter will control an unmanned locomotive using a receiver/transmitter slung from a shoulder-strap. The system is well proven overseas. In Scandinavia, for instance, train ferries are worked by remote controlled shunters. The system saves crews and as the person coupling up is actually controlling the approach of the loco, shunting damage is markedly reduced.

Surplus land is being sold around the country, and in the main centres large-scale redevelopments are proposed. Some of these schemes have been slowed by a weak economy following the sharemarket crash of 1987, but the sale or lease of land – or airspace over railway property in cities – is becoming an important part of NZR's overall business. When the North Island Main Trunk was electrified, the old copper cables for telephone circuits had to be replaced to avoid inductance problems, so the opportunity was taken to install fibre optic cables. These cables have a low capital cost per circuit, and NZR installed a larger capacity than it needed for its own use. Railways will later be able to lease off surplus capacity to business.

For a decade, NZR's operations have been controlled by the computerised Traffic Monitoring System which records the position of every wagon on the system, and its status (either loaded or empty), its contents, and other information. The system was expected to improve wagon usage by some 10 per cent and it more than fulfilled its promise. Now it is planned to add on to the TMS system; obviously if it keeps track of every vehicle it has data on distance run by every locomotive, making it easy to keep track of servicing requirements. Data on the contents of wagons and their destination can be used to bill clients.

New methods of track maintenance are being introduced this year. In the past, NZR often undertook face renewals, complete relaying of lengths of line. Now with new machinery work will concentrate on spot renewals, so that sleepers will be removed when worn out and not before, avoiding the pulling out of good sleepers as well as old. The

Example of the new wagons entering service on NZR — a GT Class double-deck car-carrying wagon. NZR has won back a large portion of new car carriage from road haulers.

welded joint programme is being expanded with a mobile flash-butt welder, in addition to established Thermit teams, with the aim of virtually eliminating the bolted joint on plain track.

In these and in many other ways, NZR is rapidly taking a new role, far different from its traditional one dating back to the early days of settlement. The new railways is concentrating on line haul over medium to long distances, bulk traffic, and unit loads. It is becoming an operation with low maintenance costs, low operating costs and high productivity. It is making better use of assets such as land, and it is even getting long-distance passenger services close to break even.

With an economic upturn expected in the medium term and with the continuing shake-out of surplus road transport capacity, NZR is poised to become one of the world's few genuinely profitable railways – and one operating in a completely deregulated environment.

Several factors combined to bring about the turnaround of New Zealand Railway's fortunes, and this must be born in mind when considering whether the New Zealand way can be applied to other countries.

In the first place, NZR is a relatively small system, with less inertia than in larger organisations.

Second, when reshaping started, NZR was in good physical condition: the motive power was modern and well kept, there were ample wagons, track and bridges were all in fine order, and there was a well-trained staff.

Three, the past two New Zealand governments, although of different political persuasions, both shared the aim of freeing the transport industry – allowing free entry into road transport and removing rail protection. Consistency of policy has helped planning.

Four, the moves towards freeing land transport were acceptable to the electorate. Farmers, manufacturers and other industrial leaders all supported the moves.

Five, Railways management were largely given a free hand to do what was necessary to adapt Railways to changed circumstances, in spite of the fact that the reduction of staff came at a time when unemployment was rising and fast becoming a political issue.

Six, railway staff at all levels accepted that something had to be done. Managers had to make unpopular decisions, and staff had to accept them. As a result, the changes were carried out with only the occasional local flare-up. Overall, union leaders accepted the need for the reshaping.

Seven, New Zealand Railways management did not react in a negative fashion. It would have been easy to retrench. But what was needed was some retrenchment, but most of all a search for new opportunities, better ways of doing things, higher quality services.

To borrow a phrase from detective stories, means, motive and opportunity were all there. Remove any one of those factors and it is possible that such dramatic changes could not be made as smoothly and efficiently as they were with NZR.

RUSSELL KING GETS THE TOP POST

AN'S NEW HEAD

Australian National's Assistant General Manager (Technical Services), Mr Russell King, has been appointed Managing Director.

Announcing the appointment, the Chairman of AN, Dr Don Williams, said: "Mr King has a wealth of commercial experience and expertise in several fields of engineering, as well as in personnel management at all levels."

Mr King joined AN in 1986 as Assistant General Manager (Technical Services) and was responsible for the engineering design, specification, acquisition, construction, maintenance and repair services to AN's mainland operations. He also had a technical advisory role in all AN Tasrail engineering activities.

Mr King became acting General Manager in January 1988, continuing to perform his previous duties.

Mr King now becomes a member of the Australian National Railways Commission.

After graduating with a Bachelor of Science and a Bachelor of Engineering from the University of New Zealand in 1959, Mr King worked as a design engineer and management consultant in New Zealand, Melbourne and Sydney for eight years.

He then moved into heavy engineering, manufacturing, construction and marine engineering, and was responsible for the construction of vessels such as roll-on roll-off vessels for ANL and patrol boats for the Royal Australian Navy, as well as commercial oil tankers and an offshore drilling rig.

Between 1977 and 1981, Mr King was an engineering consultant to the Western Australia state Ministers for Industrial Development and Resources Development. He advised on development projects in industrial and resource development, particularly the North West Shelf natural gas project.

Before joining AN, Mr King was general manager of Perry Engineering (then a division of Johns Perry Ltd). He is a Fellow of the Institution of Engineers Australia and a Fellow of the Permanent Way Institution.

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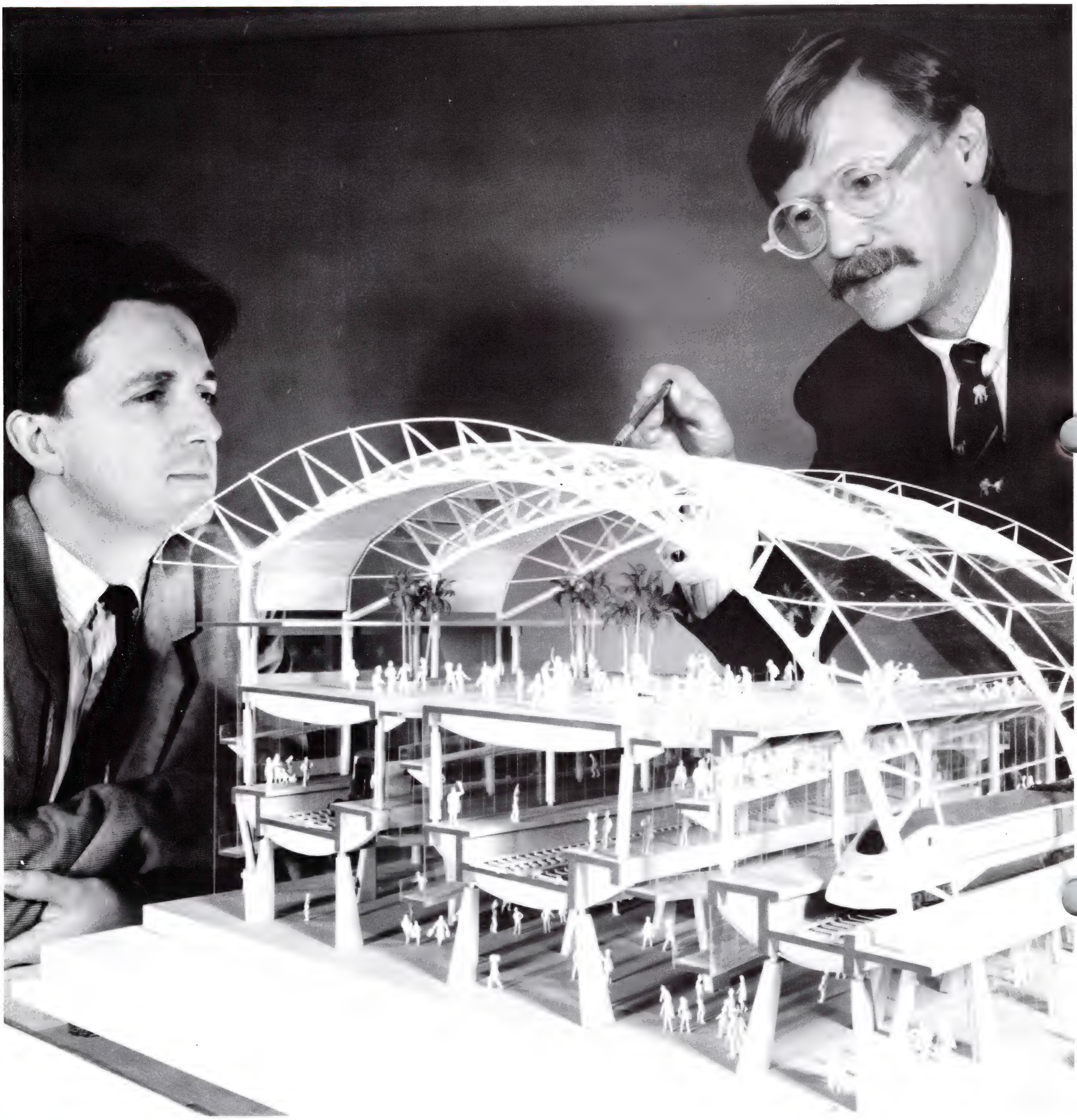

The shape of future travel? This model of British Rail's plans for the new Channel tunnel train terminal at Waterloo Station in London shows five international platforms and covered ramps so passengers can take luggage trolleys right up to the point of boarding.

Discussing it are Nicholas Grimshaw (right) and Neven Sidor of the London firm of architects working with British Rail (BR) on the plans.

The terminal is at the centre of BR's developments to meet demand for Channel tunnel rail services, due to start in the early summer of 1993. They include rolling stock and signalling and maintenance facilities.

Plans for the terminal have a departure lounge built over the international platforms and offering bars, restaurants and shops. Access to it and to the arrivals concourse on a level below the platforms would be by escalator and lifts from a new arcade, as well as by ramps.

Built above and below existing platforms at Waterloo, the new building is designed to handle more than 13 million passengers a year. It will keep domestic and international passengers apart, but there will be easy access to the existing main line station and to the London underground system, buses, a new taxi rank, and a pick-up point for cars.

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Beyond the call of duty: Westrail guards Sammy Parvone (left) and Kevin Thompson escort three Miss Australia Quest finalists on to the Australind at Bunbury, WA, where the finals were held. Westrail also provided a road coach for ferrying the finalists around the south-west of the state.

DAMAGE CONTROL

The third international conference on contact mechanics and wear of rail/wheel systems will be held in Cambridge, England, during the week 22-26 July 1990 at the conference centre in St. John's College, looking out over the Backs in the centre of the historic university town.

As with the two previous conferences, in Vancouver in 1982 and Rhode Island in 1986, this meeting will bring together those engaged in research on the surface damage of rails and wheels and those with a practical interest in the field. The 1990 meeting will focus on the mechanical and metallurgical aspects of the following topics: Elastic and inelastic contact stress; wheel and rail profiles; friction and creep characteristics; wear and lubrication; rolling contact fatigue; corrugation.

The conference organising committee contains some names well-known to Australians, including Mr C.O. Frederick, Dr S.L. Grassie, and Professor K.L. Johnson. An international organising committee consisting of Professor J.J. Kalker (Delft), Dr J. Kalousek (Vancouver), Professor K. Knothe (Berlin), Mr M.D. O'Rourke (Melbourne), Dr R.K. Steele (Chicago), and Dr K. Watanabe (Tokyo) is assisting the conference committee.

Accommodation will be at St John's College or local hotels. The full cost of the conference, including meals and accommodation in college, will be about £400 ($800). The language of the conference will be English.

For more information contact the Conference Managers, CM Conference, Jane Rowell Conferences, 43 Norwich Street, Cambridge CB2 IND, England.

RAIL RESEARCH SHARING

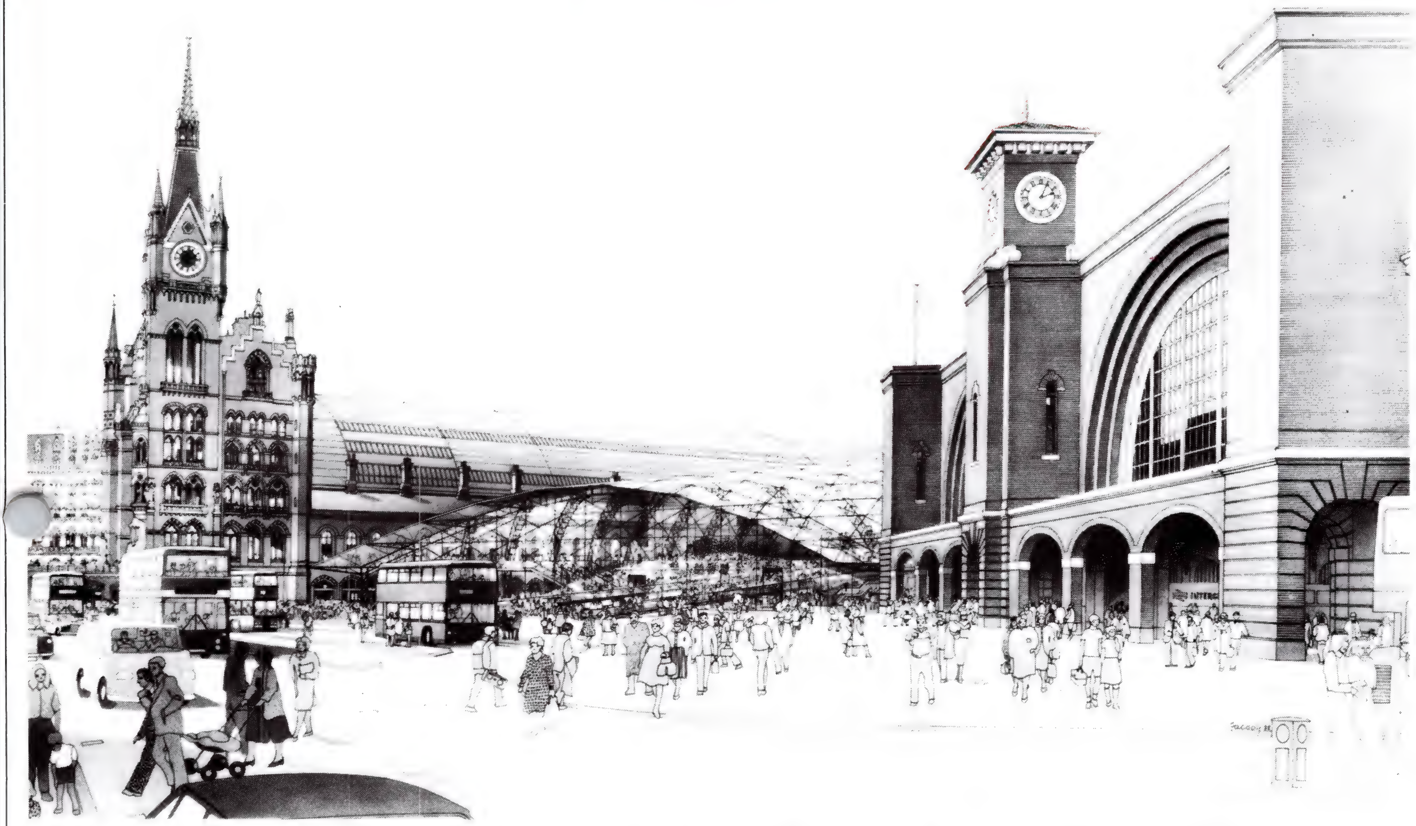
British Rail has signed an agreement with the Association of American Railroads (AAR) to collaborate on railway research.

The agreement, which follows an exchange of research information between the two organisations over several years, provides for joint research and conferences, exchange of staff and sharing of technical data.

Under the previous understanding, conferences have been held, two in Britain and two in the US, and four employees from each organisation have been involved in exchanges. They have worked on metallurgy, civil engineering, vehicle dynamics and data collection and analysis.

Dr. Alan Wickens, BR's director of engineering development and research, said: "This co-operative arrangement will enhance the productivity of the research program of both organisations. Exchanging ideas on necessary research will avoid duplication of effort and give us both access to state-of-the-art research developments." (LPS)

WINDOW SEAT



HUGE RAIL LAND REVAMP

The largest urban regeneration project in Europe is now being planned for an area of former railway and industrial land on the edge of central London. The redevelopment, covering more than 50 hectares and expected to cost some £4500 million ($9000 million), focuses on two major features: a new rail terminal and transport interchange, which may include an underground station for trains using the Channel Tunnel, and a 10-hectare canalside park.

King's Cross is already an important transport interchange, with two intercity railway stations and five London Underground railway lines. But behind its two splendid 19th century rail termini lies a wasteland of disused or underused railway goods yards, gasworks, and canal warehouses. They may be a delight to some industrial archaeologists, but they have for too long been a wasted asset close to the heart of London.

Last year, British Railways, which owns 75 per cent of the site, joined with three other landowners – the National Freight Corporation, British Gas and British Waterways – to mount a developer-designer competition. The winning design was by leading British architect Norman Foster on behalf of the London Regeneration Consortium, headed by property companies Rosehaugh PLC and Stanhope Properties, together with the National Freight Corporation.

Foster's firm, Foster Associates, is an international practice celebrated for its use of high-technology solutions. Its designs include the Hong Kong & Shanghai Bank in Hong Kong, the Centre for Contemporary Art for the city of Nimes in France, Britain's third London Airport at Stansted, east of the capital, the Sainsbury Centre for the Visual Arts at the University of East Anglia, in eastern England, and the strikingly colourful Renault distribution and training centre at Swindon, in the south-west of England.

The site for the $9000 million development is wedge-shaped, with the two stations, King's Cross and St Pancras, at its southern tip. That tip contains the two rail termini: Sir William Cubitt's 1852 King's Cross, its twin arched roofs fronted by his astonishingly modern brick facade, and William Henry Barlow's 1868 St Pancras, its great single-arch glass roof fronted by Sir George Gilbert Scott's gothic extravaganza of a railway hotel.

Both stations are Grade I historic buildings and must be preserved. Foster's bold solution is to insert between them a vaulting glass roof, larger but shallower in its curve than either. Beneath this at first and second floor level, where there is now road, will be a new, airport-style passenger concourse, with travel and ticket facilities for both stations as well as shops, restaurants and bars.

It is envisaged that passengers will register their baggage, wait in the concourse until their trains are ready, then take their hand baggage down an escalator to the platform.

The developers and their architects have also, at British Rail's request, provided for a third main-line terminal, some 50 metres below the street and deeper than any of the Underground lines. This, if built, will cater for trains coming from continental Europe through the Channel Tunnel, supplementing a terminal to be built south of the Thames at Waterloo in time for the tunnel's 1993 opening.

To the north, a covered pedestrian route will run between large commercial buildings to form a central route from the new terminal to the canal park. Foster's plan suggests that this pedestrian route could be a glass-roofed multi-storey arcade.

Though modern in style, the design has been influenced by such 19th century buildings as the Galleria Vittorio Emanuele in Milan and shopping arcades in Brussels, as well as by Sir Joseph Paxton's Crystal Palace, built for London's Great Exhibition of 1851.

The 10-hectare park is shown as a roughly egg-shaped green space fitted round an L-bend in the 168-year-old Regent's Canal. Here too a number of historic buildings are earmarked for conservation and re-use – notably a fine multi-storey granary, a picturesque row of canal company offices curving along the waterside, and a 19th century building known as the German Gymnasium.

The commercial value of the redevelopment stems largely from its proposed office premises of some 550 000 to 650 000 m², and about 23 250 m² of shopping space. Others include some 18 500 m² of workshop accommodation for small industries, and about 46 500 m² of recreation, leisure and community facilities.

Ideas for using these range from a multiscreen cinema and canalside marinas, to community facilities such as nursery schools, creches, clinics, and specialist ones such as learning centres for ethnic minority groups.

The developers also plan almost 140 000 m² of housing, ranging from expensive houses and flats for sale to low-cost homes. The latter are expected to be a fixed proportion of the total housing built.

Rosehaugh's project coordinator, Kevin McGovern, says all homes

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Actual on-the-track fuel-efficiency tests were recently conducted on a major U.S. railroad, using the GM SD60 equivalent of a Clyde Super Series Locomotive. It was pitted against their major competitor.

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will aim to meet housing needs rather than cater for the company market as has much of the new accommodation in London's redeveloped docklands. Most of the workshop area will provide replacement space for small and light industrial and other firms displaced by the development.

At present, the Foster/London Regeneration Consortium proposals have the status of a plan endorsed by the landowners. To put it into effect, British Rail must first obtain an Act of Parliament in order to modify its railway working and secure the authority to build facilities for the Channel Tunnel trains as its second King's Cross terminal. The consortium must also apply to the local authority, the London borough of Camden, for outline planning permission.

Camden appears to favour the redevelopment, but wants maximum gains for the local community. It and the consortium are embarking on a series of public consultations with local groups, now coordinated by an umbrella organisation, the Railway Lands Development Group. Further consultation will accompany detailed planning applications for each phase of the development.

Kevin McGovern envisages the first phase of the development beginning in 1990, after British Rail's enabling Act becomes law, and the whole development finishing eight to 10 years later. He stresses that the developers are determined not to build a commercial enclave that dies when the offices close. With cinemas, a theatre, shops, pubs and cafes and homes for over 5 000 people, it should be a very lively mini-town day and night.

RAIL GLASNOST

The Soviet Union is to lend the People's Republic of China 130 million Swiss francs to build a line designed to improve railway exchanges between the two countries. The project to connect the Chinese province of Xinjiang with Kazakhstan in the USSR was examined in the 1950s and then abandoned.

The new line, due for completion by 1991, will cut about 1800km off the journey between the Chinese port of Tianjin and Europe.

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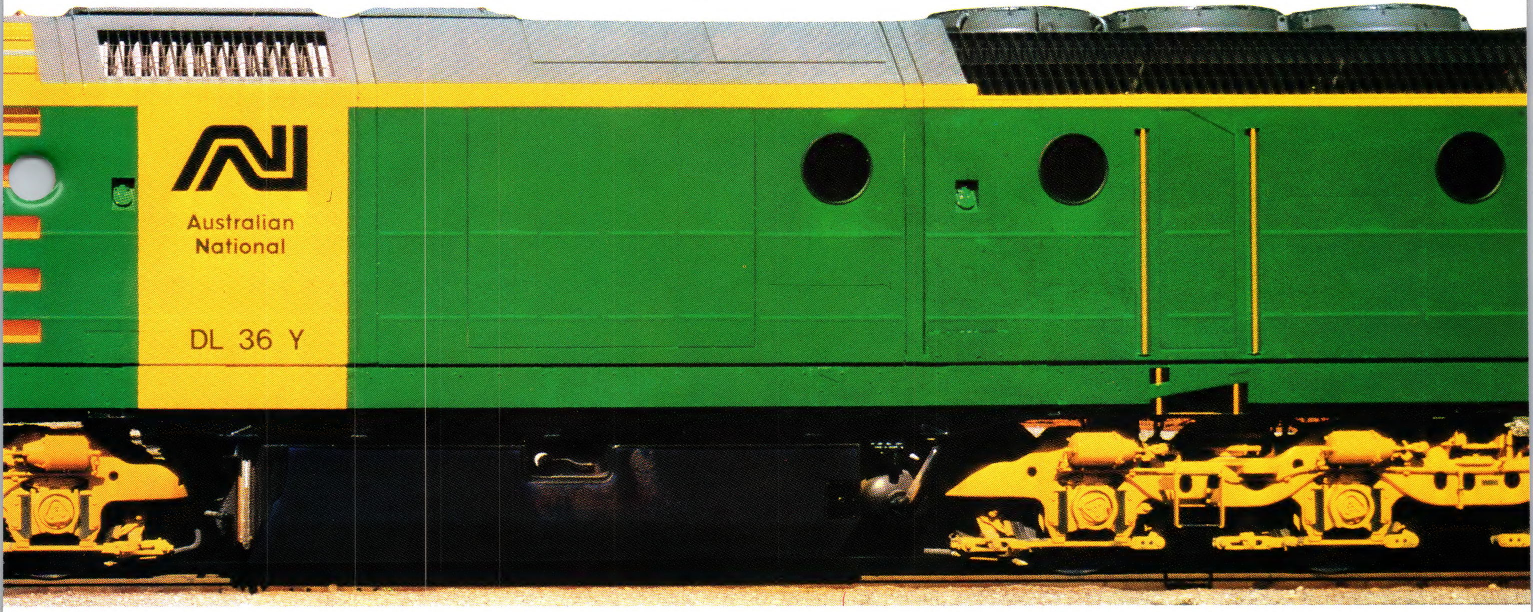

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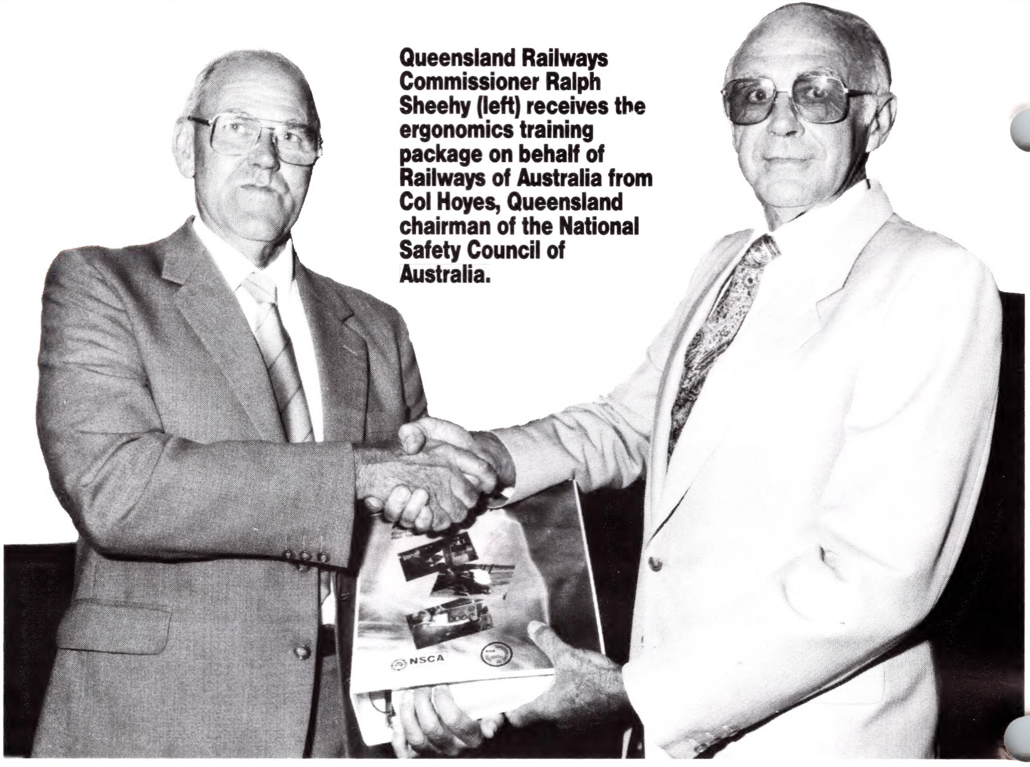
TRAINING PACKAGE TO COMBAT INJURIES

An ergonomics training package prepared by the National Safety Council of Australia for Railways of Australia is expected to lead to fewer strain injuries to employees.

Using video, overhead projection and workshops, the package sets out to show designers and managers how ergonomics can improve health, safety, efficiency and productivity in the railway workplace. Case studies are taken from the Australian rail systems, which will apply the package mainly to manual work.

The package cost $35 000 to develop, but with compensation payments averaging between $6000 and $7000 each for back injuries, it is expected to save money.

Queensland Railways was nominated to liaise with the National Safety Council of Australia in the development of the program.



Queensland Railways Commissioner Ralph Sheehy (left) receives the ergonomics training package on behalf of Railways of Australia from Col Hoyes, Queensland chairman of the National Safety Council of Australia.

SOME FARES GO UP

Fares on some interstate trains went up from 1 March 1989.

The nominal increases apply to fares, meal charges and sleeping berths. For example, first class sleepers will now be $115 between Melbourne and Adelaide (previously $107), $148 between Sydney and Melbourne ($137), and $151 between Sydney and Brisbane ($140). The new first class fares on the Indian-Pacific between Sydney and Perth will be $780, including sleeping berths for three nights and all meals ($736).

Economy sitting charges will increase marginally. For example: Melbourne-Adelaide $53 (previously $50), Sydney-Melbourne $75 ($71), Sydney-Brisbane $79 ($73). The sitting car fare between Adelaide and Perth is unchanged at $125.

Some MotoRail charges have also increased. Between Sydney and Melbourne and Sydney and Brisbane, the new MotoRail charge will be $99 ($95), between Melbourne and Adelaide $64 ($59). MotoRail fares between Sydney and Adelaide and west of Adelaide are unchanged.

New flexible booking procedures for MotoRail services mean that if the MotoRail facilities on the passenger's train are fully booked, the vehicle can be carried on the preceding or following train without extra cost.

RENEWAL FOR UNDERGROUND

The go-ahead has been given for a massive £720 million ($1440 million) modernisation of London Underground's Central Line, one of the Underground's busiest lines, carrying half a million passengers a day and serving some of London's busiest stations.

The project, which involves replacing the technology of the 1940s with systems designed to take the line into the 21st century, is expected to be completed by 1996. During the conversion the present signalling system will be maintained to keep the line open for its yearly total of 180 million passengers.

The first of 85 new trains will run between West Ruislip and Northolt by the end of 1991. They will be equipped with dot matrix indicators in the cars showing the train's final destination and announcing intermediate stops. The cars will also have two-way communication with the driver and closed-circuit TV monitors in drivers' cabs enabling them to view platforms.

The new signalling system will enable the whole line to be controlled and monitored from a central location, reducing delays and allowing more efficient handling of disruptions.

Other features of the project will include minor track realignments to raise speed limits, and an increase in power supply capacity to allow trains to run faster. Depot efficiency will also be improved through the use of a computer to log train faults and schedule maintenance. (LPS)

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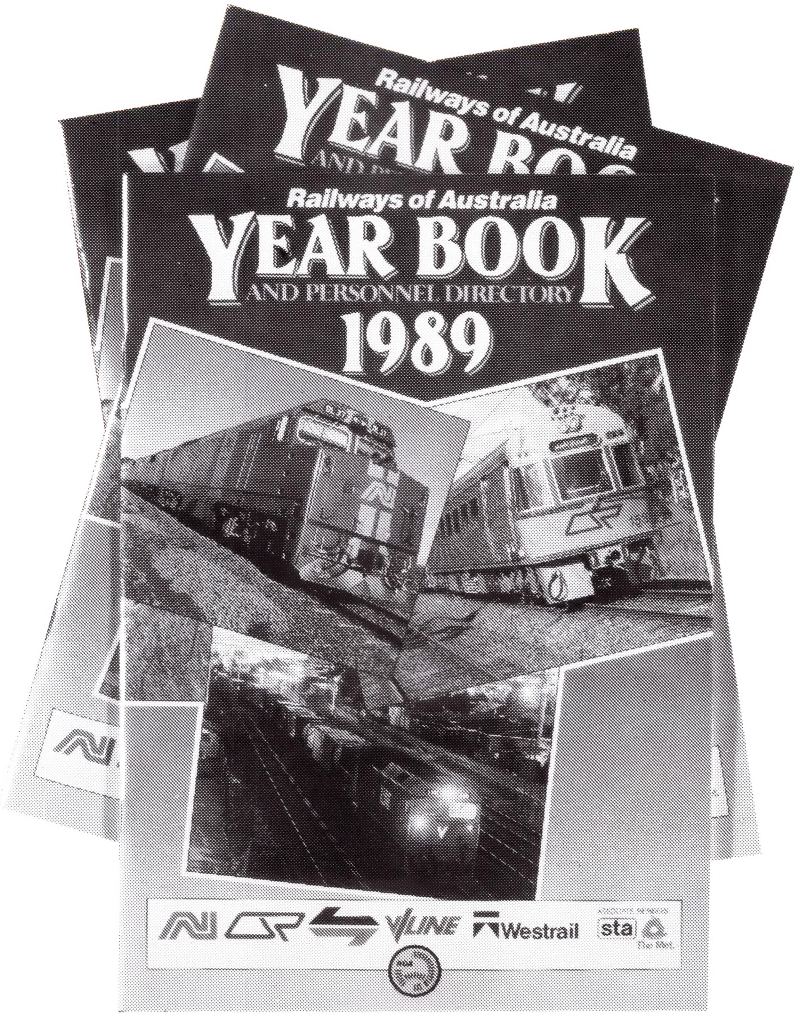

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